

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.

I
VOL. LXXIV., PART II.—Extra Number, 1905.

Materials for a Flora of the Malayan Peninsula.—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 18.

This part contains nine Natural Orders, viz., Nos. 79 *Hydrophyllaceæ* to 85 *Lentibulariaceæ* inclusive, as well as Nos. 87 *Bignoniaceæ* and 88 *Pedaliaceæ*. The whole part is the work of Lieut.-Col. D. Prain, I.M.S., F.R.S., Superintendent of the Royal Botanic Garden, Calcutta, with the exception of *Boraginaceæ*, which has been done by Sir George King, and *Hydrophyllaceæ* and *Bignoniaceæ*, which have been done by Mr. Gamble.

The nine Orders dealt with contain 53 genera and 150 species : of the species none are here described for the first time.

Natural Order No. 86 *Gesneraceæ* will follow later on with the three Orders, 75 *Apocynaceæ*, 76 *Asclepiadaceæ*, and 77 *Loganiaceæ*, the preparation of which is not yet quite complete.

Order LXXIX. HYDROPHYLLACEÆ.

Annual or perennial herbaceous plants. *Leaves* radical or alternate, rarely opposite, entire or dentate, simple or pinnately or palmately lobed. *Flowers* usually unilaterally sub-sessile on the branches of a bifid or dichotomous scorpioid cyme, or else pedunculate in the axils or on the summits of the branches ; regular, hermaphrodite. *Calyx*

inferior, with 5 or occasionally many equal imbricate lobes. *Corolla* gamopetalous, funnel-shaped cup-shaped campanulate or rotate; lobes 5, rarely many, imbricate or sometimes twisted. *Stamens* as many as the corolla-lobes, alternate with them, usually fixed to the base of the tube, exsert or included; filaments filiform, sometimes dilated or appendiculate at base; anthers ovate, oblong or linear, dorsifixed; cells 2, parallel, dehiscing introrsely with longitudinal clefts. *Ovary* superior, sometimes unilocular, with 2 free or parietal placentas, sometimes more or less completely 2-celled with fleshy placentas adnate to the septum; styles either 1 filiform bifid or undivided, or 2 distinct from the base; stigmas terminal, small or capitate; ovules 2 to many in each cell. *Capsule* loculicidally, sometimes septicidally, bi-valved, the placentas if parietal attached to the valves, if central remaining free. *Seeds* usually oblong, globose or angular, 2 to many on each placenta; testa reticulate or wrinkled, rarely smooth; albumen fleshy, embryo small, erect; cotyledons plano-convex or semi-terete.—DISTRIB. About 150 species, chiefly American, very few in the Old World.

HYDROLEA, Linn.

Herbs or undershrubs. *Leaves* entire, alternate. *Flowers* blue, in short terminal cymes or racemes. *Calyx* divided nearly to the base, segments lanceolate. *Corolla* widely campanulate, sub-rotate, lobes imbricate. *Stamens* 5, attached to the corolla-tube; filaments filiform, sometimes dilated at base; anthers sagittate. *Ovary* completely 2-celled, with fleshy placentas adnate to the dissepiment; styles 2, rarely 3, distinct, filiform; stigmas capitate; ovules many in each cell, multi-seriate. *Capsule* globose or ovoid, septicidal, usually 2-, rarely 3- or 4-valved. *Seeds* minute, irregularly wrinkled.—DISTRIB. About 14 species, chiefly American, with one Chinese, one of tropical Africa, and one of India and Malaya.

HYDROLEA ZEYLANICA, Vahl Symb. II. 46 (1791). An annual herb; stems nearly glabrous below, glandular pubescent above, soft, somewhat succulent, often rooting, always straggling. *Leaves* membranous; lanceolate or oblong-lanceolate, attenuate above and below; 5 to 2 in. long, 2 to 5 in. broad; glabrous or slightly pubescent; petiole none or very short and winged by the decurrent blade. *Flowers* in racemes on short lateral leafy branches. *Calyx-lobes* acute, glandular-pubescent, 3-nerved, about 3 in. long. *Corolla-lobes* ovate, 2 in. long, many-nerved, blue. *Stamens* with sagittate, often twisted anthers, and filaments dilated at base. *Capsule* shorter than the calyx-lobes, ovoid, 2-lobed; placentas central, adherent at their backs to the dissepiment. *Seeds* very many,

oblong, obtuse, testa very faintly wrinkled. Lamk III. t. 184; Wall. Cat. 4398; W. & A. in Hook. Comp. Bot. Mag. II. 193, t. 26; Wight III. t. 167, and Ic. t. 601; Choisy in DC. Prod. X. 180; Dalz. & Gibs. Bomb. Fl. 170; Miq. Fl. Ind. Bat. II. 633; Clarke in Hook. f. Fl. Br. Ind. IV. 133; Trimen Fl. Ceyl. III. 191. Cooke Bomb. Fl. II. 197; Prain Beng. Plants 711. *H. javanica*, Blume Bijdr. 725. *Namazeilanica*, Linn. Sp. Pl. 226; Roxb. Fl. Ind. II. 73. "Tsjeru Vallel," Rheede Hort. Mal. X. t. 28.

PERAK: Wray 2571, 3336; *Seorteehini*; Ridley 2906; King's Collector 391, 2577.—DISTRIB. Throughout India, Ceylon, Burma, Siam, Java, Malaya, China, the Philippines; also in Australia, tropical Africa and America, in wet places and rice-fields.

Order LXXX. BORAGINÆ.

Herbs, shrubs, or trees, often conspicuously hispid or scabrous. *Leaves* alternate, very rarely opposite, ex-stipulate, usually entire, rarely in verticils. *Flowers* usually in scorpioid dichotomous cymes, sometimes trichotomously paniculate, rarely solitary and axillary, bracteate or not, hermaphrodite. *Calyx* inferior, 5-lobed (rarely 6- to 8-lobed), the lobes imbricate, rarely valvate, usually persistent in fruit. *Corolla* gamopetalous, of various forms, often with scales in the throat; the limb 5-lobed (rarely 4- to 6-lobed), the lobes imbricate, rarely twisted. *Stamens* as many as the lobes and alternate with them, inserted on the tube; anthers ovate to linear, introrse; filaments slender, often dilated at the base. *Disk* under the ovary or obsolete. *Ovary* superior, sessile, cells 2 with 2 ovules in each, or 4 with 1 ovule in each; style terminal or from the depression between the lobes of the ovary, long or short; stigma entire and capitate or 2-lobed, the style rarely twice bifid; ovules sub-erect from the basal angle of the cell. *Fruit* drupaceous with a hard 2- to 4-celled endocarp or dividing into 2 or 4 nutlets with thin or fleshy walls. *Seeds* erect or oblique, with membranous testa and fleshy albumen or ex-albuminous; embryo curved or straight, radicle superior.—DISTRIB. Universal. Species about 1,500.

Styles twice partite; drupe 4-1-seeded; trees or shrubs; calyx enlarging in fruit 1. *Cordia*.

Styles simple or only bi-partite; rarely (*Coldenia*) 2 or more and distinct; drupe including two 2-seeded or four 1-seeded pyrenes; calyx only slightly or not at all enlarged in fruit:—

Styles depressed-conical at the apex or with a horizontal ring below or at the stigmas:—

- Styles short, shortly 2-lobed; pyrenes two 2-seeded; herbs or shrubs 2. *TOURNEFORTIA*.
 Styles elongated, dilated at the apex; pyrenes four 1-seeded, much resembling nutlets; herbs 3. *HELIOTROPIMUM*.
 Styles elongated, not dilated or annular at the apex, more or less bi-partite:—
 Styles 2-fid at the apex; pyrenes two 2-seeded, or four 1-seeded; trees or shrubs 4. *EHRETIA*.
 Styles more or less separate, distinct at base and apex, united but easily separable in the middle; pyrenes four 1-seeded, much resembling nutlets; prostrate herbs .. 5. *COLDENIA*.

1. *CORDIA*, Linn.

Trees or shrubs. *Leaves* alternate, rarely sub-opposite, petiolate. *Flowers* in dichotomous cymes with scorpioid branches, or corymbose or in clusters, ebracteate, polygamous, the ♀ fewer than the ♂. *Calyx* tubular or campanulate, usually with short and often irregular teeth, accrescent in fruit. *Corolla* funnel- or salver-shaped or campanulate; the lobes of the limb 4 to 8, spreading or recurved, white or orange. *Stamens* as many as the lobes; anthers sagittate or hastate, shortly exserted; filaments often hairy near the base. *Ovary* 4-celled, glabrous; style terminal, long, bi-partite, the branches again bifid, linear or sub-spathulate, cells of ovary 1-ovuled. *Fruit* ovoid or ellipsoid, surrounded by the enlarged calyx; the putamen bony, with 1 to 4 cells, but one only with a fertile seed. *Seed* exalbuminous, the cotyledons large and fleshy or thin but always plicate.—*DISTRIB.* About 280 species, all tropical.

Flowers about 1·5 in. long 1. *C. subcordata*.
 Flowers less than ·5 in. long:—

- Leaves broadly ovate, sub-acute or obtuse, the base often cordate 2. *C. Myxa*.
 Leaves ovate-lanceolate, acuminate, the base cuneate .. 3. *C. Griffithii*.

1. *CORDIA SUBCORDATA*, Lamk Ill. 1899 (1792). A small tree; young branches as thick as a goose-quill, glabrous, pale brown when dry. *Leaves* membranous; broadly ovate or ovate-rotund, the apex acute, the base broadly rounded or sub-cordate; both surfaces brown when dry, the lower paler, harshly and minutely reticulate; main-nerves 4 or 5 pairs, faint on both surfaces when dry; length 3·5 to 6·5 in., breadth 2·5 to 4 in.; petiole 1·25 to 2 in. *Corymbs* lateral, few-flowered, shorter than the leaves, glaberulous; pedicels ·25 in. long. *Calyx* cylindric, slightly widening towards the mouth, ·4 in. long and nearly ·2 in. wide at the middle, glabrous; the limb with 3 broad triangular teeth. *Corolla* about 1·3 in. long, orange or reddish, funnel-shaped; lobes about 6, broad, spreading, as long as the tube. *Stamens* 6.

Stigma with linear-spathulate branches. *Fruit* very bony, pyramidal, its apex acute, with 4 bold angles, the spaces between the angles often with large tubercles, 1 in. long and as much in breadth from angle to angle, usually with 1 or more seeds; entirely enveloped in the much-inflated glabrous accrescent apiculate calyx. Wall. Cat. 9063; DC. Prod. IX. 477; Seem. Fl. Viti, t. 34; Benth. Fl. Austral. IV. 385; Kurz For. Fl. Burm. II. 209; Clarke in Hook. fil. Fl. Br. Ind. IV. 140; Miq. Fl. Ind. Bat. II. 914. *C. orientalis*, R. Br. Prod. 498. *C. campanulata*, Roxb. Fl. Ind., ed. Carey & Wall. II. 336. *C. Rumphii*, Blume Bijdr. 843. *C. hexandra*, Roem. & Schult. Syst. IV. 799. Rumph. Herb. Amb. II. t. 75.

PERAK: *Scortechini* 1084. DINDINGS: *Curtis* 3447. KEDAH: *Ridley* 5526. PAHANG: *Ridley* 2158.—DISTRIB. British India, Malay Archipelago, Australia, Sandwich Islands. Widely cultivated in other places.

2. *CORDIA MYXA*, Linn. Sp. Pl. 190 (1753). A tree, 40 to 50 feet high; young branches thinner than a goose-quill, glabrous. *Leaves* thinly coriaceous; broadly ovate, apex sub-acute or obtuse, the base slightly cordate; upper surface when dry dark brown, glabrous, faintly reticulate; the lower paler brown, distinctly and minutely reticulate, the transverse veins very prominent, glabrous except for some pubescence on the midrib and 5 or 6 pairs of curved ascending main-nerves; length 3 to 3.75 in., breadth 2 to 2.75 in.; petioles .75 to 1.25 in. *Cymes* trichotomous, shorter than the leaves, terminal. *Male and female* flowers often in the same tree, mostly 5-merous. *Calyx* campanulate, more than .25 in. long, glabrous, smooth outside, silky inside. *Corolla* with its tube included in the calyx, the lobes projecting and .15 in. long, reflexed; style in the ♀ flowers short, 4-cleft, absent in the ♂. *Fruit* ellipsoid, with acute apex and rounded base, compressed, with 3 or 4 angles (one or more of them indistinct), .75 in. long and .4 in. broad, 2- or more-seeded; the persistent accrescent calyx leathery with strong vertical reticulations, widely campanulate, its mouth with shallow irregular crenations, length .25 in., width .4 to .5 in. DC. Prod. IX. 479; Delile Fl. Ægypt. t. 19, fig. 1; Roxb. Fl. Ind., ed. Carey & Wall., II. 232; Wall. Cat. 889; Wight Ill. t. 169; Benth. Fl. Austral. IV. 386; Bedd. Fl. Sylv. t. 245, fig. A; Brandis For. Fl. 336 (*in part*); Kurz For. Fl. Burm. II. 208; Boiss. Fl. Or. IV. 124; Miq. Fl. Ind. Bat. II. 915; Clarke in Hook. fil. Fl. Br. Ind. IV. 136; Trimen Fl. Ceyl. III. 193; Cooke Fl. Bomb. II. 199; Prain Beng. Plants 714. *C. Myxa*, var. *b. minor only*, Thw. Enum. Pl. Zeyl. 214. *C. indica*, Lamk Dict. VII. 49; DC. Prod. IX. 500. *C. officinalis* and *C. africana*, Lamk Ill. II. 420, and t. 96, fig. 3. *C. Sesbestena*, Forsk. Fl. Aeg.-Arab. LXIII. *C. paniculata*, Roth Nov. Spec. 124; DC. Prod.

IX. 482. *Sebestena officinalis*, Gaertn. Fruct. I. 364, t. 76. *Ehretia glabra*, Roth Nov. Spec. 127; DC. Prod. IX. 510. *Beurrieria glabra*, G. Don Gen. Syst. 390.

MALACCA and SINGAPORE : probably introduced.—DISTRIB. Tropics of the Old World.

3. *Cordia Griffithii*, Clarke in Hook. fil. Fl. Br. Ind. IV. 139 (1883). A small tree; young branches about as thick as a crow-quill, puberulous, pale and angled when dry. *Leaves* thinly coriaceous; ovate-lanceolate, acute or acuminate, the base slightly cuneate; both surfaces brown when dry (the lower the paler), minutely reticulate, glabrous; main-nerves 3 or 4 pairs, curved, ascending; length 1·5 to 3·5 in., breadth 1 to 1·75 in.; petioles ·65 to 1·25 in. *Cymes* slender, 2·5 to 4 in. long (including their peduncles), dichotomous, lax, few-flowered, puberulous. *Flowers* ·4 in. long, almost sessile. *Calyx* ·25 in. long, funnel-shaped; the mouth wide, oblique, and with 5 irregular short teeth. *Corolla* funnel-shaped, much longer than the calyx; the limb longer than the tube, deeply divided into 5 narrowly elliptic reflexed lobes. *Stamens* 5, attached to the throat of the tube; anthers oblong, exserted; filaments unequal in length, flattened below. *Ovary* obovoid, smooth, 4-celled, ovules solitary in each cell; style thin and cylindric above, swollen in its lower half, exserted.

MALACCA : *Griffith* (K.D.) 5997; *Maingay* (K.D.) 1162; *Ridley* 4561. SELANGOR : *Ridley* 7373. KEDAH : *King's Collector* 1742.

2. *TOURNEFORTIA*, Linn.

Trees or shrubs, sometimes almost herbs, and often sub-scandent. *Leaves* alternate, entire. *Cymes* scorpioid, dichotomous, usually terminal, rarely lateral or extra-axillary. *Flowers* small, numerous, crowded, sessile or on short pedicels, ebracteate. *Calyx* deeply 4- or 5-partite, the segments ovate or lanceolate. *Corolla* white or greenish; the tube cylindric, naked in the throat; the lobes of the limb 5 or 4, small, spreading. *Stamens* 5 or 4, included in the tube; anthers oblong-ovate or lanceolate, apiculate or not; filaments short. *Ovary* 4-celled; style terminal, short, 2-lobed (in the Indo-Malayan species); ovules 1 in each cell, pendulous from the upper inner part of the cell. *Drupe* small, ovoid, slightly fleshy or leathery, indistinctly separating into two 2-seeded or into four 1-seeded pyrenes. *Seeds* straight or curved, pendulous, albuminous; embryo straight or curved.—DISTRIB. About 130 species, in the tropics of both hemispheres.

TOURNEFORTIA WALLICHII, DC. Prod. IX. 527 (1845). A climber, 10 to 30 feet long; young branches terete, twice as thick as a crow's-quill, minutely rusty-puberulous, becoming glabrous. *Leaves* thickly mem-

branous; ovate, the apex acute or shortly acuminate, the base rounded, slightly oblique; both surfaces when dry brown, the upper quite glabrous, the lower paler, reticulate, sometimes with a few small hairs on the nerves; main-nerves 4 or 5 pairs, curved, ascending, depressed like the midrib on the upper surface, prominent on the lower; length 2 to 3·5 in., breadth ·75 to 1·75 in.; petioles ·3 to ·4 in. *Cymes* terminal and lateral (extra-axillary), on long peduncles, dichotomously branched, sub-glabrous. *Flowers* ·3 to ·4 in. long, sessile, forming crowded one-sided pseudo-spikes (scorpioid cymes) on the terminal inch or two of the branches of the cymes. *Calyx* about ·05 in. long, only about a sixth or a seventh as long as the corolla, cleft nearly to the base into 4 broadly triangular acute spreading segments. *Corolla-tube* 4-angled; the limb short, with 4 ovate teeth, glabrous. *Anthers* 4, oblong, sessile or nearly so, near the throat. *Fruit* broadly ovoid, ·15 to ·2 in. long, with 4 vertical grooves (2 of them deep) on the sides, and a depression on the apex. Clarke in Hook. fil. Fl. Br. Ind. IV. 147. *T. tetrandra*, Wall. Cat. 911 (not of Blume). *Tetrandra Walliehii*, Miq. Fl. Ind. Bat. II. 928.

SINGAPORE: *Maingay* (K.D.) 1165, 8041; *King's Collector* 302.
PERAK: *Wray* 3536; *Ridley* 2431; *King's Collector* 3335, 5158
Seortechini 1494.—DISTRIB. Java, Sumatra.

3. HELIOTROPIMUM, Linn.

Annual or perennial herbs, very hairy or scabrous. *Leaves* alternate. *Flowers* small, white, or pale purple, sometimes in terminal dichotomous cymes with scorpioid branches and small or no bracts, sometimes axillary in the axils of large bracts. *Calyx* divided into 5 linear or lanceolate segments. *Corolla* with a cylindric tube and limb of various shapes, the lobes of the latter always imbricate or induplicate in bud, spreading in flower. *Stamens* 5, included, inserted on the tube by short filaments; anthers ovate-oblong or lanceolate. *Ovary* completely or imperfectly 4-celled, 4-ovulate; style short or long, terminal, with a depressed conical or flat disk on its apex; stigma above the disk, none or short or elongate, entire or rarely bifid. *Fruit* dry, 2- to 4-grooved or -lobed, and consisting of 4 nutlets free from the beginning or finally becoming so. *Seeds* straight or curved; albumen none, small or large; cotyledons plano-convex.—DISTRIB. Species about 225, widely distributed in both hemispheres.

Leaves ovate-lanceolate, 1·5 to 2·5 in. long ..	..	..	1. <i>H. indicum</i> .
Leaves linear, ·5 to 1 in. long ..	..	..	2. <i>H. strigosum</i> .

1. HELIOTROPIMUM INDICUM, Linn. Sp. Pl. 130 (1753). Herbaceous,

but woody at the base, a foot or two in height, with few branches; the branches, lower parts of the inflorescence, and the petioles with white stiff hairs. *Leaves* membranous, greenish-brown when dry; ovate or ovate-lanceolate, slightly inequilateral, the apex usually acute, the base rounded, irregularly cordate, often unequally so; both surfaces with some scattered long white hairs; the lower surface pale and faintly reticulate when dry; main-nerve 6 to 8 pairs, rather straight, ascending, slightly prominent on the lower surface; length 1·5 to 2·5 in., breadth ·75 to 2 in.; petioles ·4 to 1·5 in. *Cymes* scorpioid, terminal and lateral (extra-axillary), about 2 in. long (lengthening with age to 5 or 6 in.), on peduncles about 1 in. long; the rachises hispid, compressed when dry. *Flowers* about ·15 in. long, sessile, numerous. *Calyx* about ·05 in. long, deeply divided into 5 narrowly lanceolate sub-erect hispid segments. *Corolla* tubular, slightly dilated at the base; the limb with 5 broad blunt reflexed lobes; anthers 5, included, inserted about the middle of the tube. *Fruit* ·1 in. long, conical, with an apical beak and with 4 bold vertical ridges and 4 faint ones, glabrous naturally separating into 2 halves, each half consisting of 2 cohering pyriform pyrenes with long beaks and a single large sub-quadrate white seed. Roxb. Fl. Ind. I. 454; Bot. Mag. t. 1837; Clarke in Hook. fil. Fl. Br. Ind. IV. 152; Trimen Fl. Ceyl. III. 200; Cooke Fl. Bomb. II. 207; Prain Beng. Plants 716. *H. anisophyllum*, Beauv. Fl. Ow. et Ben. II. 62, t. 96. *Tiaridium indicum*, Lehm. Asperifol. 14; Wall. Cat. 913; Wight Ill. t. 171. *T. anisophyllum*, G. Don Gen. Syst. IV. 364. *Heliophyllum indicum*, DC. Prod. IX. 556; Fresen. in Mart. Fl. Brasil, fasc. 22, 48, t. 10, fig. 4; Miq. Fl. Ind. Bat. II. 925. *H. vclutinum*, DC. l.c. 557.

SINGAPORE: *King's Collector* 318; *Hullett* 21. PAHANG: *Ridley* 1547. PENANG: *Deschamps*. PERAK: *Scortcehini* 163.—DISTRIB. India, Malaya, E. Asia, tropical Africa and America.

2. *HELIOTROPIMUM STRIGOSUM*, Willd. Sp. Pl. I. 743 (1797). Herbaceous, woody at the base, erect, a foot high, the branches few, slender, long, not spreading, very strigose, like all the rest of the plant. *Leaves* linear, ·5 to 1 in. long, very narrow, becoming smaller upwards. *Flowers* under ·1 in. long; their pedicels longer, sub-opposite to a linear bract or often extra-axillary. *Sepals* ovate-acute, enlarging in fruit. *Corolla* salver-shaped; stigma narrowly conical. *Fruit* depressed, 4-lobed, under ·1 in. broad, glabrous and shining, sometimes with a few small hairs. DC. Prod. IX. 546; Clarke in Hook. fil. Fl. Br. Ind. IV. 151; Boiss. Fl. Orient. IV. 143; Prain Beng. Plants 716. *H. brevifolium*, Wall. Cat. 914; Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 2; DC. l.c. 546. *H. compactum*, Don Prod. 101.

In all the provinces, by waysides, not common.—DISTRIB. From W. Asia through India to Australia.

4. EHRETIA, Linn.

Glabrous or scabrous shrubs or trees. *Leaves* alternate, entire or dentate. *Flowers* small, usually white, in axillary or terminal corymbs or panicles, rarely on 1-flowered axillary peduncles. *Calyx* small, 5-partite. *Corolla* with short cylindric tube; the limb with 5 obtuse imbricate spreading lobes. *Stamens* 5, inserted on the tube, exserted, rarely included, ovate or oblong. *Ovary* 2-celled, the cells bi-ovulate; sometimes imperfectly 4-celled and the cells with solitary ovules; style terminal, cylindric, bifid or bi-partite; stigmas small, capitate or clavate. *Drupe* small, usually globose, 4-seeded or (by suppression) 1-3-seeded; usually dividing into 2 bilocular or into 4 unilocular, often compressed pyrenes. *Seeds* straight, with little albumen and thin testa.—DISTRIB. About 55 species, all tropical, chiefly in the Old World.

Leaves ovate to elliptic-oblong, shortly acuminate, with about 5 pairs	
of main-nerves	1. <i>E. levis</i> .
Leaves obovate or obovate-elliptic, obtuse retuse or sub-acute, with	
7 or 8 pairs of main-nerves	2. <i>E. parallela</i> .

1. EHRETIA LEVIS, Roxb. Cor. Pl. I. 42, t. 55; var. *timorensis*, Clarke in Hook. fil. Fl. Br. Ind. IV. 142 (1883). A small tree; young branches rusty-puberulous, becoming ultimately glabrous, dark coloured when dry. *Leaves* thinly coriaceous; ovate to elliptic-oblong, shortly acuminate, the base slightly cuneate or sometimes rounded; both surfaces glabrous, brown when dry, the lower paler and reticulate; main-nerves about 5 pairs, rather straight, ascending slightly, thin but prominent on the lower surface like the midrib; length 2·5 to 5 in., breadth 1·25 to 2·25 in.; petioles about 4 in. *Cymes* axillary and terminal, shorter than the leaves, corymbose, puberulous; the ultimate branches scorpioid. *Flowers* small, numerous, sessile. *Calyx* less than 1 in. long, its mouth with 5 oblong lobes. *Corolla-tube* 1 in. long; the lobes 5, shorter and spreading. *Anthers* exserted. *Fruit* when 4-seeded about 2 in. in diam., smaller when 2-seeded, depressed-globose, ribbed; pyrenes 4 or 2, sometimes only 1, each with a single seed; the persistent calyx much shorter than the fruit, its lobes acuminate. *E. timorensis*, Dene. in Nouv. Ann. Mus. d'Hist. Nat. III. 395; DC. Prod. IX. 505. *E. philippinensis*, DC. l.c. 504. *E. levis*, Benth. Fl. Austral. IV. 389.

MALACCA: *Maingay* (K.D.) 1164; *Ridley* 3302. PERAK: *Scortechini*

167, 898; *King's Collector* 7436, 8344.—DISTRIB. Burma, *Griffith* (K.D.) 6002, Malay Archipelago, Australia.

2. *EHRETIA PARALLELA*, Clarke in Hook. fil. Fl. Br. Ind. IV. 143 (1883). A shrub, all parts except the inflorescence glabrous; young branches thinner than a goose-quill, pale when dry. *Leaves* membranous; obovate or obovate-elliptic, obtuse, from retuse to sub-acute, cuneate at the base; both surfaces dark brown when dry; main-nerves 7 or 8 pairs, scarcely curved, ascending, parallel, very bold and distinct on the lower surface like the midrib (when dry), faint on the upper; length 1·5 to 1·75 in., breadth ·75 to 1 in.; petiole ·25 in. Inflorescence, flowers, and fruit as in *E. laevis*, Roxb., var. *timorensis*, but smaller.

PENANG: *Curtis* 1572.—DISTRIB. Burma, *Griffith* (K.D.) 6004.

5. *COLDENIA*, Linn.

Much-branched, diffuse or prostrate scabrous herbs. *Leaves* alternate, crisped. *Flowers* small, axillary, sessile or sub-sessile; the upper sometimes in a short one-sided bracteate cyme. *Calyx* 4-5-partite. *Corolla* with short funnel-shaped tube and 4 or 5 spreading segments imbricate in bud. *Stamens* 4 or 5, inserted on the tube; anthers ovate. *Ovary* broadly ovoid, 2-celled, with 2 ovules in each cell, or imperfectly 4-celled with 1 in each; styles 2, distinct at the base but united upwards (although easily separable); stigmas 2, capitate. *Fruit* almost dry, composed of 4 sub-connate 1-seeded pyrenes; seeds with thin testa and little if any albumen; the cotyledons plane.—DISTRIB. Species 12, 10 of which are American, 1 African, and the undernoted which is cosmopolitan.

COLDENIA PROCUMBENS, Linn. Sp. Pl. 125 (1753). A scabrous-hairy prostrate herb. *Leaves* elliptic-obovate, coarsely and deeply serrate, almost pinnatifid. *Fruit*, prior to disintegration into its component pyrenes, pyramidal. Gaertn. Fruct. I. 329, t. 68; Lamk Ill. t. 69; Roxb. Fl. Ind. I. 448; Wall. Cat. 942; DC. Prod. IX. 558; Miq. Fl. Ind. Bat. II. 933; Clarke in Hook. fil. Fl. Br. Ind. IV. 144; Trimen Fl. Ceyl. III. 197; Cooke Bomb. Fl. II. 205; Prain Beng. Plants 718. *Lobophyllum tetrandrum*, F. Muell. in Hook. Kew Journ. Bot. IX. 21. *Waltheria microphylla*, Miq. in Pl. Hohenack. n. 87B (not of Cav.).

By waysides, not common.—DISTRIB. Everywhere in the tropics.

Order LXXXI. CONVOLVULACEÆ.

[By D. PRAIN.]

Herbs or shrubs, usually twining, occasionally erect; very rarely trees; sometimes parasitic. *Leaves* alternate or in parasitic species

obsolete; stipules 0. *Flowers* in cymes, rarely solitary, regular, hermaphrodite; bracts at cyme-bases or under solitary flowers opposite; bracteoles at base of pedicels small, scale-like. *Sepals* 5, imbricate, occasionally slightly connate below, often persistent, sometimes accrescent. *Corolla* campanulate or infundibuliform, rarely sub-rotate; limb with 5 short or long lobes often plicate in bud, after flowering either involute or reverting to the original æstivation. *Stamens* 5, adnate to corolla-tube; anthers oblong, opening by longitudinal introrse or lateral slits. *Carpels* usually 2, very rarely 3 or more; connate throughout in a superior ovary with its base often encircled by an annular or lobed disk, and its cells as many or, by development of accessory partitions, twice as many as the component carpels, rarely, from absorption of dissepiments, fewer than carpels; ovules 2 in each carpel, sessile erect anatropous; style solitary or rarely styles 2; stigma capitate or 2-lobed or 2-fid. *Fruit* an indehiscent often dry berry, or a 2-4-valved or circumscissile or irregularly opening capsule. *Seeds* 4 to 2, rarely solitary, erect; albumen scanty or 0; cotyledons generally plicate, rarely flat.—**DISTRIB.** Species about 1,000, in all regions, but more abundant in sub-tropical and tropical countries.

Corolla-tube usually uniformly enlarged from base to apex, the 5 bands or lobes rarely, except in *Erycibe*, clearly defined from the intervening spaces; pollen not spinulose:—

Yellow parasitic twining leafless herbs 1. *CUSCUTA*.

Green non-parasitic leafy herbs, shrubs or trees:—

Fruit indehiscent, woody or fleshy, rather large; style short or 0; stigma 5-10-rayed; corolla-lobes 2-fid, the lobules induplicate, contorted; woody, climbing shrubs or erect trees 2. *ERYCIBE*.

Fruit dehiscent, or if indehiscent small, with thin fragile walls:—

Flowers in racemes or panicles—

Bracts not enlarged in fruit; outer 3 or all of the sepals enlarged in fruit; style entire or shortly 2-lobed; capsule indehiscent or rarely 2-valved 3. *PORANA*.

Bracts in fruit much enlarged, scarious, adnate to calyx; sepals not enlarged; capsule 4-valved, 1-seeded .. 4. *NEUROPELTIS*.

Flowers in cymes or solitary; capsule valvate or opercular, rarely dehiscent irregularly:—

Styles 2, free or partially united below; sepals not or slightly enlarging in fruit:—

Capsule 4-valved, 2-1-locular, 4-2-seeded; styles quite free, each 2-branched; cymes few-flowered .. 5. *EVOLVULUS*.

Capsule irregularly dehiscent, splitting into numerous vertical segments; styles usually partially united below, stigmas capitate; cymes sub-capitate .. 6. *BONAMIA*.

Style entire, stigmas usually 2:—

Ovary 1-locular; capsule 4-valved, 4-seeded; stigmas shortly oblong; calyx-lobes not enlarged in fruit:—

- Bract enveloping the calyx; pollen spherical .. 7. CALYSTEGIA.
 Bract not enveloping the calyx; pollen polyhedral .. 8. HEWITTIA.
 Ovary 2-locular, sometimes 4-locular:—
 Outer 3 sepals much larger than the 2 inner, and
 decurrent on the peduncle; stigmas capitate .. 9. ANISEIA.
 Outer 3 sepals not larger than the 2 inner, and not
 decurrent on the peduncle:—
 Stigmas elliptic; capsule 8-valved, rarely 4-valved 10. JACQUEMONTIA.
 Stigmas globose:—
 Capsule 4-valved; fruiting sepals not enlarged;
 bands of corolla usually with 5 purple lines;
 stems not winged 11. MERREMIA.
 Capsule with circumscissile dehiscence; fruiting
 sepals considerably enlarged; bands of corolla
 without lines; stems winged 12. OPERCULINA.
 Corolla-tube not uniformly enlarged from base to apex, the
 5 bands on the lobes clearly defined by 2 prominent lines; pollen
 spinnlose:—
 Fruit dehiscent, or if indehiscent then with thin fragile walls:—
 Stamens arising from the backs of 5 scales attached to
 the corolla-tube; flowers small urceolate, fasciculate; fruit
 4-valved 13. LEPISTEMON.
 Stamens arising directly from the corolla-tube:—
 Corolla more or less campanulate; calyx-lobes never
 aristate, inflorescence never scorpioid; stamens not ex-
 serted 14. IPOMOEIA.
 Corolla more or less hypocrateriform; calyx-lobes aristate,
 or if obtuse the inflorescence scorpioid; stamens exserted:—
 Flowers rather small, pink or red, slightly irregular .. 15. QUAMOCLIT.
 Flowers large white, regular 16. CALONYCTION.
 Fruit indehiscent, coriaceous or fleshy:—
 Ovary 4-celled 17. AROYREIA.
 Ovary 2-celled 18. LETTISOMIA.

1. CUSCUTA, Linn.

Leafless twining yellow-reddish parasitic herbs. *Flowers* small, white or rose-coloured, fascicled, sessile or shortly pedicelled; bracts small or 0. *Sepals* 5 or 4, sub-equal; free or shortly connate at the base. *Corolla* ovoid or campanulate, usually with a ring of fimbriate or lobed scales near the base or below the stamens; lobes short, imbricate. *Stamens* 5 or 4, adnate near throat of corolla; filaments short, linear; anthers oblong, partially exserted. *Ovary* more or less completely 2-celled; ovules 4; styles 2 or 1; stigmas 2. *Fruit* a globose or ovoid, dry or succulent, circumscissile or irregularly bursting 4-2-seeded capsule. *Seeds* glabrous; albumen fleshy; embryo slender, spiral; cotyledons minute or obsolete.—*DISTRIB.* Species about 80, in temperate and tropical regions.

CUSCUTA HYGROPHILÆ, H. H. W. Pears. in Hook. Ic. Plant. t. 2704.

A small slender parasitic twiner. *Flowers* in dense umbellate cymes, .25 in. wide. *Sepals* ovate obtuse, connate below, .1 in. long. *Corolla* .15 in. wide, campanulate; lobes ovate obtuse. *Stamens* 5, shortly exerted. *Scales* near base of corolla-tube shortly fimbriate. *Ovary* obtuse, more or less perfectly 2-celled; ovules 4; styles 2; stigmas capitate. *Fruit* an oblate capsule, .15 in. wide.

JOHORE: near the town, parasitic on *Hygrophila quadrivalvis*, Ridley 9161!

Closely related to *C. chinensis*, from which it differs in having the sepals without keels, and of which the writer believes it to be a form.

2. ERYCIBE, Roxb.

Shrubs, scandent or diffuse, less often erect; rarely trees. *Leaves* alternate, elliptic, entire, coriaceous. *Flowers* rather small; cymes in axillary or terminal panicles or racemes; bracts lanceolate, small. *Sepals* 5, small, sub-equal, orbicular, coriaceous, adpressed to base of fruit. *Corolla* rather small, white or yellowish, sub-rotate; tube hirsute externally; limb 5-lobed, the lobes obcordate, induplicate-contorted in bud, with a thicker triangular centre externally hirsute, and sub-membranous semicordate margins glabrous on both sides. *Stamens* 5, sub-included, adnate to throat of corolla; filaments short; anthers ovate-lanceolate. *Ovary* globose, 1-celled; ovules 4; stigma large, sessile, sub-globose or conic, 5- or 10-ridged. *Fruit* a fleshy, leathery or woody berry, ovoid or ellipsoid. *Seed* solitary, glabrous; albumen scanty, intruded between folds of fleshy cotyledons.—DISTRIB. Species about 30; throughout S.E. Asia.

Leaves more or less pubescent beneath:—

Pubescence on under surfaces of leaves persistent:—

Branches angular; bark fissured; pubescence on under side of leaves black, closely adpressed; leaves with acuminate tips, the lateral nerves in 5 pairs, obliquely ascending, hardly visible above 1. *E. strigosa*.

Branches cylindric; bark not fissured: pubescence on under surface of leaves not adpressed, brown or tawny; leaves obtuse, the lateral nerves in 12 to 15 pairs, spreading not very oblique; fruit velvety 2. *E. magnifica*.

Pubescence on under surface of leaves usually disappearing, except from the midrib, as the leaves become old; branches with fissured bark:—

Flowers in pyramidal terminal panicles, the panicle branches subtended by foliaceous bracts 3. *E. expansa*.

Flowers in axillary cymes, or if passing into a terminal panicle the panicle branches not subtended by foliaceous bracts:—

- Flowers often passing into a terminal panicle; corolla greenish; fruit ellipsoid, black, .6 in. long, .35 in. wide .. 4. *E. Princei*.
- Flowers all axillary; corolla white; fruit ellipsoid, purple, with a faint apical areola, .75 in. long, .5 in. wide .. 5. *E. malaccensis*.
- Leaves quite glabrous on both surfaces:—
- Flowers in both terminal and axillary panicles; leaves with lateral nerves distinct, but secondary venation indistinct .. 6. *E. angulata*.
- Flowers always axillary:—
- Leaves small, never exceeding 1.75 in. long, sub-bifarious; flowers solitary, axillary. 7. *E. leucoxyloides*.
- Leaves medium to large, very rarely, and never all, less than 2 in. long, arranged spirally; flowers never solitary:—
- Lateral nerves of leaves distinct and secondary reticulate venation distinct on both surfaces, or at least beneath:—
- Lateral nerves of leaves 7 to 9 pairs .. 8. *E. festiva*.
- Lateral nerves of leaves 6 or fewer pairs:—
- Fruit quite glabrous .. 9. *E. sapotacca*.
- Fruit finely velvety .. 10. *E. Stapfiana*.
- Lateral nerves of leaves indistinct, secondary venation not visible:—
- Corolla rufous-pubescent internally as well as externally .. 11. *E. praeipua*.
- Corolla glabrous internally:—
- Flowers densely glomerate in leaf axils; leaves pale waxy greenish-yellow beneath .. 12. *E. glomerata*.
- Flowers in short but open axillary cymes:—
- Leaves thickly coriaceous; fruit verrucose but not scurfy externally .. 13. *E. aenea*.
- Leaves sub-coriaceous; fruit scurfy but not verrucose externally .. 14. *E. Griffithii*.

1. *ERYCIBE STRIGOSA*, Prain Journ. As. Soc. Beng. LXV. 2. 536. A climber 40 to 60 feet long, with stems 1 to 2 in. in diam.; branches slightly angled with fissured bark, and except along the fissures densely clothed with black adpressed tomentum; branchlets angular with black adpressed tomentum. *Leaves* elliptic or ovate-lanceolate, base cuneate, apex rather long acuminate, with tip obtuse; 3 to 4 in. long, 1.5 to 1.75 in. wide; thinly coriaceous; dark green, quite glabrous above, brownish-black and densely covered with black adpressed tomentum beneath; lateral nerves 5 pairs, oblique, distinct beneath not visible above, secondary venation indistinct beneath not visible above; petiole .75 to 1 in. long, with close adpressed black tomentum. *Flowers* in few-flowered cymes, .25 in. across, disposed in narrow axillary panicles 3 to 6 in. long, .5 in. wide; main-rachis angular, densely rusty-pubescent, the peduncles of individual cymes .25 in. long or less, densely rusty-pubescent, as are the linear deciduous bracteoles .15 in. long, and the very short pedicels. *Sepals* orbicular, rusty-pubescent. *Corolla* white, .3 in. across (but not quite fully opened), the lobes spreading, glabrous

within; interlobular spaces brown tomentose externally; lobules ovate, their margins sub-entire. Hallier f. Bull. Herb. Boiss. V. 737.

PERAK: Thaipeng, 500 to 800 feet elevation; *King's Collector* 8461!

2. *ERYCIBE MAGNIFICA*, Prain Journ. As. Soc. Beng. LXXIII. 2. 18. A strong creeper 80 to 100 feet long, stem 2 to 3 in. in diam.; old branches .75 in. in diam. still densely tomentose, quite cylindric, with large pith; branchlets .3 in. in diam., densely velvety with a tawny to rusty matted tomentum. *Leaves* elliptic or elliptic-obovate, with a narrowly truncate or rounded base, and an obtuse or sometimes retuse apex, the margin strongly revolute; 8 to 10 in. long, 3.5 to 4 in. wide; coriaceous; upper surface quite glabrous, dark green and shining with sometimes a silvery, sometimes a rich coppery sheen; under surface velvety, pale brownish-green, the tomentum longer, looser, and sometimes whitish on the main-nerves; lateral nerves rather straight, spreading, 12 to 15 pairs, rather distinctly looped along the margin, prominent beneath, deeply impressed above, as is the secondary reticulate venation; petiole .35 in. long, densely rusty-velvety. *Flowers* in short axillary racemes, sometimes clustered, of close-set 2-3-flowered individual cymes; the racemes 1 to 2 in. long; peduncles, short pedicels and small ovate bracts and bracteoles densely rusty-velvety. *Sepals* orbicular, densely velvety outside, quite glabrous within, coriaceous, in fruit .2 in. across. *Corolla* .5 in. across; lobes slightly spreading, glabrous within, and waxy white or yellow, narrow and deeply divided; interlobular spaces densely dark brown, almost black velvety-pubescent externally; lobules very small oblong. *Fruit* ellipsoid, 1.25 in. long, 1 in. in diam., densely softly velvety, of a rich brown colour.

PERAK: *King's Collector* 3454! 3879! 6721!

In the first of his three gatherings Kunstler has noted this as a tree 50 to 70 feet high, but in the two subsequent ones as a large creeper, which is, from the appearance of the specimens, undoubtedly the case with the first gathering also.

3. *ERYCIBE EXPANSA*, Wall. Cat. 1331. A large climber, branches angled, with fissured bark, glabrous; branchlets angular, densely rusty-tomentose. *Leaves* elliptic or slightly obovate, apex abruptly shortly acuminate to a sharp tip, base rounded or sub-cordate; 2 to 2.5 in. long, 1 to 1.5 in. wide; chartaceous; dark green, quite glabrous above, paler and rusty-pubescent, especially on the nerves, beneath, the pubescence ultimately disappearing except from the nerves in old leaves; lateral nerves 2 to 3 pairs, very oblique, ascending; secondary reticulate venation fairly visible above only; petioles .15 in. long, densely rusty-pubescent. *Flowers* in rather condensed 5-9-flowered cymes disposed in pyra-

midal terminal panicles 3 to 15 in. long, 1·5 to 6 in. wide, the main rachis and branches deusely rusty-tomentose, the panicle branches ·75 to 2·5 in. long, subtended by large foliaceous bracts ·4 to 1 in. long, exactly like the foliage leaves but smaller; peduncles of individual cymes rusty-tomentose, ·25 in. long; pedicels bracteolate, ·1 in. long or less, rusty-tomentose. *Sepals* orbicular, rusty-pubescent. *Corolla* white, or white tinged with pink, ·45 in. wide; lobes spreading, glabrous within; interlobular spaces densely rusty-pubescent externally; lobules ovate acute, their margins sub-entire. G. Don Gen. Syst. IV. 392; Clarke in Hook. f. Flor. Brit. Ind. IV. 181; Prain Journ. As. Soc. Beng. LXIII. 2. 84; Hallier f. Bull. Herb. Boiss. V. 737. *E. ferruginea*, Griff. Notul. IV. 283. *E. paniculata*, β . *expansa*, Choisy Ann. Sc. Nat. 2. I. 222; DC. Prod. IX. 464. *E. coriacea*, Kurz For. Flor. Burm. II. 213 partly (not of Wall.).

KEDAH: Lankawi, *Curtis* 2128!—DISTRIB. Tenasserim.

4. *ERYCIBE PRINCEI*, Wall. Cat. 1335. A large straggling bush with spreading branches, or a stout climber; branches glabrous, the bark more or less fissured but quite cylindric; branchlets densely rusty-tomentose, cylindric. *Leaves* obovate-oblong or rarely obovate-lanceolate, narrowed slightly to the narrowly truncate or sometimes rounded base, more abruptly to the shortly acuminate or acute apex, with an obtuse or occasionally acute tip; 2·5 to 4 in. long, 1·25 to 1·75 in. wide; coriaceous, shrinking somewhat irregularly when dry; glabrous rather pale green above, beneath at first rusty pubescent with a loose tomentum, which soon disappears except from the midrib; lateral nerves 5 to 7 pairs, very oblique and not very prominent on either surface, with a distinct sub-marginal looping vein; secondary reticulate venation distinct but not prominent on either surface; petiole ·2 to ·25 in. long, rusty-pubescent. *Flowers* in axillary cymes in the uppermost leaf axils, 5–9-flowered, ·75 in. wide, the ultimate 3 to 7 passing into a terminal panicle without leaves 1·5 to 3 in. long, rarely longer; peduncles ·15 to ·25 in. long, rusty-pubescent; pedicels very short and lanceolate bracteoles, ·2 in. long, rusty-pubescent. *Sepals* orbicular, coriaceous, rusty-pubescent. *Corolla* greenish, sweet-scented, ·4 in. across; lobes slightly spreading; interlobular spaces shining golden silky externally; lobules ovate, margins finely undulate. *Fruit* ellipsoid, black, smooth, ·6 in. long, ·35 in. in diam. Choisy in Ann. Sc. Nat. 2. I. 224; DC. Prod. IX. 464; Clarke in Hook. f. Flor. Brit. Ind. IV. 152; Prain Journ. As. Soc. Beng. LXIII. 2. 85; Hallier f. Bull. Herb. Boiss. V. 737 (excluding the Assam and Khasia localities), 1052. *E. camptobotrya*, Miq. Flor. Ind. Bat. Suppl. 578.

MALACCA: *Griffith* 5883 (K.D.)! *Maingay* 1155 (K.D.)! SINGA-

PORE: in hedges, frequent, *Kurz* 2968! *Hullett* 628! 642!—DISTRIB. Bangka, Sumatra, Borneo.

5. *ERYCIBE MALACCENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A stout spreading shrub with straggling branches, or a climber extending to 100 feet in length; branches glabrous, with fissured bark, but cylindric; branchlets stellately puberulous, rather distinctly angled. *Leaves* elliptic, oblong or obovate-oblong, narrowed from the middle or beyond to the cuneate or narrowly truncate base and more abruptly to the shortly acuminate apex with obtuse tip; 3 to 3·5 in. long, 1·25 to 1·5 in. wide; thickly chartaceous; dark green, shining, quite glabrous above; paler glaucescent beneath and at first pubescent with a deciduous tomentum which soon disappears except from the rusty midrib; lateral nerves 5 to 6 pairs, usually very oblique, rather distinct on both surfaces as is the secondary reticulate venation; petiole ·25 in. long, rusty-tomentose. *Flowers* in axillary 5-9-flowered cymes, ·5 in. wide; peduncles ·2 to 1·5 in. long, rusty-tomentose; bracteoles elliptic, fulvous-tomentose, small; pedicels ·15 in. long, rusty. *Sepals* orbicular, fulvous-tomentose. *Corolla* glabrous within, white, ·35 in. across; lobes slightly spreading; interlobular spaces fulvous-tomentose externally; lobules ovate, margins slightly undulate. *Fruit* ellipsoid, purple, ·75 in. long, ·5 in. in diam. with a faint apical areola, glabrous. Prain Journ. As. Soc. Beng. LXIII. 2. 85; Hallier f. Bull. Herb. Boiss. V. 738.

PERAK: Larut, *King's Collector* 3093! 3180! 3575! *Seorteehini* 2196! Kota, *Wray* 2412! PENANG: *Maingay* 1154! MALACCA: Bukit Labukor, *Ridley* 3526! Batu Tiga, *Derry* 1042!—DISTRIB. Tenasserim.

6. *ERYCIBE ANGULATA*, Prain Journ. As. Soc. Beng. LXIII. 2. 84. A robust scandent shrub or a strong climber; stems sometimes over 100 feet long and 4 to 6 in. in diam.; branches terete, glabrous; ultimate branchlets angular, rusty-pubescent. *Leaves* obovate, base cuneate or rounded, apex shortly acuminate or rounded or sometimes deeply emarginate (normally shortly acuminate); 4 to 8 in. long, 2 to 4 in. wide; coriaceous, quite glabrous; lateral nerves 5 to 8 pairs, visible above, distinctly raised beneath; secondary venation indistinct; petioles ·5 in. long, rusty-pubescent. *Flowers* in few-flowered cymes disposed in axillary and terminal panicles with angular rachis clothed with dark-red tomentum; axillary inflorescences 1 to 6 in. long, 1 to 1·5 in. wide, terminal 7 to 10 in. long, with sometimes floral leaves intermixed; pedicels bracteolate, ·25 to ·5 in. long. *Sepals* orbicular, outer stellately rusty-tomentose, inner ciliate. *Corolla* white, ·5 in. wide; lobes spreading; interlobular spaces hirsute externally; lobules glabrous, ovate-oblong, with slightly undulate margins. Hallier f. Bull. Herb.

Boiss. V. 739. *E. paniculata*, Miq. Flor. Ind. Bat. Suppl. 248 (not of Roxb.).

PERAK: Larut, King's Collector 7379! Dijong, Scortechini 1816!—

DISTRIB. Sumatra (Teysmann 3682).

When originally describing this species the writer referred to it a Java specimen collected by Kurz; Dr. Hallier, however, whose knowledge of *Convolvulaceae* is so profound, has shown that this Java specimen, which is not a very good one, belongs in reality to a distinct species—*E. macrophylla*, Hallier f.

7. *ERYCIBE LEUCOXYLOIDES*, King MSS. ex Ridl. in Herb. Singap.; Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A very large climber with slender cylindric branches, bark fissured and covered with a close grey pubescence; branchlets numerous, very slender, rather distinctly angled, grey- or rusty-pubescent. *Leaves* sub-bifarious, ovate or ovate-lanceolate, base rounded, apex sub-acuminate or abruptly narrowed to an obtuse tip; 1 to 1.75 in. long, .4 to .6 in. wide; membranous or thinly chartaceous; quite glabrous on both surfaces; rather dark green above, paler beneath; secondary nerves about 3 pairs, very oblique and hardly visible above except in young leaves, not visible beneath even when dry and even when young; petiole .1 in. long, grey-pubescent. *Flowers* axillary, solitary; pedicels .2 in. long, somewhat recurved in fruit, grey-pubescent, bracteolate under the calyx. *Sepals* orbicular, sparsely pubescent on the centre externally, elsewhere glabrous except the ciliate margins. *Corolla* white, sweet-scented, .5 in. across; interlobular spaces brown-tomentose externally; lobules broad, semi-orbicular, entire. *Fruit* elliptic, black, smooth, glabrous, .6 in. long, .4 in. wide.

SINGAPORE: climbing in secondary jungle, Hallier! Ridley 2051, 6897! 10927! SELANGOR: Kwala Lumpur, Curtis 2402! JOHORE: Ridley!

8. *ERYCIBE FESTIVA*, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A climber, 60 to 70 feet long (Kunstler), or a small tree (Hullett); branches grooved but cylindric; ultimate branchlets slightly angular, sparingly pubescent. *Leaves* elliptic or oblong, base cuneate, apex usually rather long acuminate with an obtuse tip; 3 to 6 in. long, 1.5 to 2.5 in. wide; glabrous; thinly coriaceous; lateral nerves 7 to 9 pairs, distinct on both surfaces, especially beneath, secondary venation distinct beneath; petiole glabrous, .5 to .75 in. long. *Flowers* in short axillary 7-12-flowered cymes .5 to .75 in. across; peduncles .3 to .5 in. long, rusty-pubescent; pedicels rusty-pubescent, bracteolate, .12 in. long. *Sepals* orbicular, rusty-pubescent. *Corolla* pale greenish-white within, .75 in. across, lobes broad; interlobular spaces brown-tomentose externally; lobules ovate, margins erose, usually rather deeply, through-

out. Prain Journ. As. Soc. Beng. LXV. 2. 536; Hallier f. Bull. Herb Boiss. V. 739.

PERAK: in open forest in rocky localities, at 500 to 800 feet elevation, *King's Collector* 6445! SINGAPORE: garden jungle, *Ridley* 6043! *Hullett*!

9. ERYCIBE SAPOTACEA, Hallier f. & Prain Journ. As. Soc. Beng. LXXIII. 2. 16. A tree (?); branches slightly angled, with fissured bark, quite glabrous. *Leaves* elliptic, base cuneate, apex abruptly shortly acuminate with tip obtuse; 5 in. long, 2 to 2.25 in. wide; firmly coriaceous; quite glabrous on both sides; bright green and glossy above, pale beneath; lateral nerves 6 pairs, distinct above and rather prominent beneath, secondary reticulate venation very distinct on both surfaces; petiole .5 in. long, glabrous. *Flowers* in few-flowered congested, axillary subsessile cymes. *Sepals* and *Corolla* not seen. *Fruit* ovoid, quite glabrous, the epicarp very coriaceous, almost woody, wrinkled and fissured, with a rounded base and conical pointed apex, 2 in. long, 1 in. in diam.; fruiting pedicels .3 in. long, with epidermis fissured like that on the branches.

PENANG: Government Hill, *Curtis* 772!

A very distinct and striking species, the flowers of which are as yet unknown. In shape the fruit is most like that of *E. Griffithii*, but besides being about twice the size it has none of the scurfy covering of the fruit of that species. The leaves of the two are very different.

10. ERYCIBE STAFFIANA, Prain Journ. As. Soc. Beng. LXIII. 2. 87. A shrubby or slender climber, sometimes 80 to 100 feet long; much branched; branches and glabrous branchlets cylindric. *Leaves* usually oblong or elliptic, rarely narrowly lanceolate, narrowed to a cuneate or narrowly truncate base, apex shortly acuminate with a blunt tip; 4 to 7 in. long, 2 to 3 in. wide; coriaceous; glabrous; dark green and glossy above, paler beneath; lateral nerves 4 to 6 pairs, ascending obliquely, the lowest pairs extending more than half-way along the margin, the secondary veins reticulately raised beneath, visible but not conspicuous above; petiole .25 in. long, glabrous. *Flowers* in clustered axillary cymes .5 to 2 in. long, in fascicles of 4 to 9 from a woody protuberance, each 5-20-flowered; peduncles densely dark-brown-tomentose, as are the bracteolate pedicels, .1 to .15 in. long. *Sepals* orbicular, densely brown-tomentose. *Corolla* waxy-white within, .5 in. across; lobes narrow; interlobular spaces very dark-brown-tomentose (nearly black—*Kunstler*) externally; lobules narrow, divergent, slightly crenulate along the obliquely truncate apex. *Fruit* ovoid, .6 to .8 in. long, .5 in. in diam., densely clothed with a fine dark-brown velvety tomentum. Hallier f. Bull. Herb. Boiss. V. 738.

PERAK: at various elevations from 300 to 4,000 feet, *King's Collector* 4015! 4115! 7784! *Wray* 3371! *Scortechini* 1793!—DISTRIB. Tenasserim (*Parish*).

11. *ERYCIBE PRÆCIPUA*, Prain Journ. As. Soc. Beng. LXIII. 2. 86. A large climbing shrub; branches and ultimate branchlets cylindric, glabrous. *Leaves* narrowly elliptic to elliptic, narrowed to the cuneate base and more abruptly to the obtuse tip; thickly coriaceous; quite glabrous; 1·5 to 4 in. long, ·75 to 2 in. wide; nerves about 5 pairs, curved and ascending, but all very obscure even when dry; petioles ·3 in. long, glabrous. *Flowers* in small, axillary, laxly 5–8-flowered cymes ·5 in. across; peduncles and bracteolate pedicels closely rusty-pubescent, pedicels ·12 in. long. *Sepals* orbicular, the outer minutely, the inner densely closely rusty-pubescent. *Corolla* whitish, ·5 in. wide, the lobes very narrow, spreading; interlobular spaces rufous-pubescent internally as well as externally; lobules small glabrous, narrowly oblong, sub-acute, divergent. *Fruit* ovoid, slightly rough but not verrucose, ·7 to ·75 in. long, ·5 to ·6 in. wide, pointed or rounded.

PENANG: Government Hill, *Curtis* 911! 1273! PERAK: Larut, *Scortechini*!

Father Scortechini's specimens from Perak have the fruit slightly smaller, not at all pointed, and not so distinctly roughened as the Penang specimens, but in all other respects the two plants agree.

12. *ERYCIBE GLOMERATA*, Bl. Bijdr. 1047. A shrub or a small tree, 10 to 20 feet high, erect, much spreading; branches and sparingly pubescent ultimate branchlets cylindric. *Leaves* elliptic or narrow-oblong, shortly or gradually narrowed to the cuneate base and to the obtuse tip; 7 to 12 in. long, 1·75 to 5 in. wide; coriaceous; quite glabrous; dark green above, waxy-pale greenish-yellow (*Kunstler*) beneath; lateral nerves 8 to 9 pairs, visible but not raised on either surface or only faintly raised beneath; petiole ·15 to ·35 in. long. *Flowers* in axillary very short and closely glomerate 5–8-flowered cymes; peduncles ·05 in. long; individual flowers nearly sessile with 3 rusty-pubescent bracteoles at the base of the calyx. *Sepals* almost glabrous, pale waxy-green (*Kunstler*), orbicular, margins ciliate. *Corolla* pure white within, 1·25 in. across; lobes narrow; interlobular spaces rufous externally; lobules oblong, obtuse, slightly crenulate at the apex. Hallier f. Bull. Herb. Boiss. V. 382, 739. *E. albida*, Prain Journ. As. Soc. Beng. LXIII. 2. 87.

VAR. *typica*; leaves elliptic, 3·5 to 5 in. wide.

PERAK: on Gunong Bubu, 2,500 to 3,000 feet, *King's Collector* 7373! Larut, *Scortechini*! PUNGAH: *Curtis* 2947!—DISTRIB. JAVA.

VAR. *longifolia*, Bl. Bijdr. 1047; leaves cuneate-oblong, obtusely acuminate, 1·75 to 2·25 in. wide. *E. angustifolia*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Waterfall Hill, Wray 2580! MALACCA: Bujong, Seortechini 1908!—DISTRIB. Java, Borneo.

13. *ERYCIBE AENEA*, Prain Journ. As. Soc. Beng. LXIII. 2. 85. A very large climber; stems 70 to 150 feet long, 3 to 4 in. in diam.; branches and densely rusty-tomentose branchlets cylindric. Leaves narrowly oblong or elliptic, base cuneate, apex gradually or oftener abruptly narrowed to an obtuse tip; thickly coriaceous; quite glabrous; 2·5 to 5 in. long, 1 to 2 in. wide; lateral nerves 5 to 6 pairs with a distinct sub-marginal connecting nerve, impressed on both surfaces but especially beneath; petiole ·25 in. or less. Flowers in axillary 3–20-flowered cymes ·25 to 1·2 in. long; peduncles and bracteolate pedicels minutely closely rusty-tomentose; pedicels ·12 in. long. Sepals orbicular, closely brown-tomentose. Corolla pale yellow, ·5 in. across, the lobes spreading; interlobular spaces pale brown-tomentose externally; lobules ovate-oblong, their margins undulate. Fruit elliptic, verrucose, grey, ·9 in. long, ·5 to ·6 in. wide. Hallier f. Bull. Hort. Boiss. V. 739.

PERAK: Larut, at elevations of from 300 to 2,500 feet, King's Collector 7337! 8165!

14. *ERYCIBE GRIFFITHII*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182. A climber 60 to 80 feet long; stem 4 to 6 in. in diam.; branches cylindric, glabrous; branchlets cylindric, sparingly rusty-pubescent. Leaves elliptic, rarely ovate-lanceolate or obovate-oblong, base cuneate or rarely rounded, apex usually abruptly acuminate, less often gradually narrowed to the obtuse tip; 2·75 to 6 in. long, ·75 to 2·5 in. wide; quite glabrous on both surfaces, sub-coriaceous; lateral nerves 6 to 8 pairs, very oblique, visible but not prominent above, prominent beneath; secondary venation very indistinct; petiole ·25 to ·3 in. long, glabrous. Flowers in short axillary solitary or clustered 4–9-flowered cymes ·3 in. across; peduncles rusty-pubescent, ·2 to ·3 in. long; pedicels ·25 in. long, rusty-pubescent as are the very minute ovate-lanceolate bracteoles. Sepals orbicular, rusty-pubescent externally. Corolla waxy cream-coloured and glabrous within, ·5 in. across, the lobes spreading, narrow and stellate; interlobular spaces rusty-brown externally; lobules narrow acute, their margins sub-entire. Fruit coriaceous, greyish-brown and closely scurfy externally, 1 to 1·5 in. long, ·5 to ·75 in. wide. Prain Journ. As. Soc. Beng. LXIII. 85; Hallier f. Verslag. Buitenzorg, 1895. 126; Bull. Herb. Boiss. V. 738, 1052. *E. Maingayi*, Clarke in Hook. f. Flor. Brit. Ind. IV. 182; Hallier f. Bull. Herb. Boiss. V. 737. *E. micrantha*, Hallier f. Engl. Bot. Jahrb. XVI. 524.

PERAK: Larut, 200 to 300 feet elevation, *King's Collector* 8191! *Scortechini*! MALACCA: *Maingay*. PENANG: *Gaudichaud* 120; *Curtis* 181! *King's Collector* 1458!—DISTRIB. Tenasserim, Sumatra, Philippines.

3. PORANA, Burm.

Large climbers. *Leaves* petioled, ovate or cordate, entire. *Flowers* small; cymes often in large panicles; bracts persistent; bracteoles subulate or 0. *Sepals* 5, small and narrow in flower; in fruit the outer 3 or all 5 much accrescent, membranous and spreading, usually spathulate. *Corolla* white, campanulate or infundibuliform with a wide or narrow throat; limb spreading plicate, sub-entire or 5-lobed. *Stamens* 5, adnate to corolla-tube, sub-included; filaments linear or filiform. *Ovary* 2-celled or 1-celled; ovules 4 or 2; style long or short, entire or 2-fid; stigma solitary 2-lobed, or stigmas 2, capitate. *Fruit* globose oblong or obconic, 1-seeded, membranous, indehiscent or opening by 2 valves. *Seed* glabrous; cotyledons plicate.—DISTRIB. Species about 10, throughout S.E. Asia.

PORANA VOLUBILIS, Burm. Fl. Ind. 51. t. 21. f. 1. A large climber; stems and warted branches glabrous, young shoots pubescent. *Leaves* glabrous, ovate sub-cordate, or sometimes base rounded, apex shortly acuminate, quite glabrous, 2·5 in. long, 1·5 in. wide; petiole ·6 in. long. *Flowers* white, small, in sub-ebracteate cymes disposed in panicles 12 to 15 in. long, minutely tawny-pubescent; pedicels ·1 to ·25 in. long. *Sepals* 5, minutely pubescent, in flower ·2 in. long, oblong; in fruit ·35 in. long, sub-spathulate, all equal. *Corolla* ·3 in. long; tube narrow; limb rather distinctly 5-lobed. *Stamens* 5, included. *Ovary* 2-celled; ovules 4; style 2-partite; stigmas small, capitate. *Fruit* a globose capsule, enclosed in the accrescent 5–7-nerved calyx-lobes, ·15 in. in diam. *Seed* solitary. Lamk Ill. t. 186; Roxb. Fl. Ind. ed. Carey & Wall. II. 40; ed. orig. I. 465; Blume Bijdr. 723; Wall. Cat. 1327; Choisy Convolv. Or. 106, and in DC. Prod. IX. 436; Clarke in Hook. f. Flor. Brit. Ind. IV. 222.

MALACCA: *Griffith*! *King*!—DISTRIB. Indo-China, Malay Archipelago.

King's examples are from a cultivated plant; whether those of Griffith be from wild plants is unknown.

4. NEUROPELTIS, Wall.

Large scandent, tomentose shrubs. *Leaves* ovate or oblong, firm, petioled. *Flowers* many, small, in axillary racemes or terminal panicles; pedicels distinct, beset by solitary ovate-lanceolate bracteoles under the calyx, in flower inconspicuous, in fruit greatly accrescent.

Sepals 5, sub-orbicular, hardly altered in fruit. *Corolla* small, white; tube wide-campanulate; limb deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* 5, exserted or included, adnate to corolla-tube; filaments filiform. *Ovary* imperfectly or perfectly 2-celled; ovules 4; styles 2, free throughout, stigmas sub-capitate wavy or obscurely lobed. *Fruit* a globose, 4-valved, 1-seeded capsule sessile near the centre of the flat, much-accrecent bracteole. *Seed* globose, glabrous, albuminous; cotyledons plicate.—**DISTRIB.** Species 2, in tropics of Eastern Hemisphere.

NEUROPELTIS *RACEMOSA*, Wall. Cat. 1322. A robust climber; branchlets pubescent, lenticellate, rather dark. *Leaves* alternate, elliptic-lanceolate, base cuncate, apex acuminate with a narrow longish thickened mucro; lamina 2·5 to 5 in. long, 1·25 to 2·25 in. wide; firmly papery; glabrous except along the midrib above, slightly rusty with a sub-persistent pubescence beneath; lateral nerves about 7-paired, somewhat curved forward, rather prominent and pubescent beneath. *Flowers* in axillary racemes 2 to 5 in. long, peduncle ·5 to 1 in. and rachis rusty-tomentose; bracts small ovate; pedicels ·12 to ·2 in. long, tomentose, slender, with an ovate-lanceolate bracteole under the calyx. *Sepals* 5, somewhat connate below, small, orbicular, rufous-villous. *Corolla* small, campanulate, white, tube rufous-villous externally; limb ·25 to ·3 in. across, 5-lobed, lobes ovate nearly as long as the tube. *Stamens* 5, adnate to corolla-tube, exserted; filaments thickened at base. *Ovary* imperfectly or perfectly 2-celled, rufous-villous at base; ovules 2 in each cell; styles 2, glabrous; stigmas large globose wavy. *Capsule* ·25 in. long, ovoid, glabrescent, sessile in the centre of the accrescent, orbicular, scarious, reticulate bract 1 to 1·75 in. wide with rounded or cordate base. *Seed* globose, glabrous, albuminous; cotyledons plicate. Roxb. Flor. Ind. ed. Carey & Wall. II. 44; Deless. Ic. Select. V. t. 96; Choisy Convolv. Or. 109, t. 2. f. 12, and in DC. Prod. IX. 437; Bedd. Ic. Pl. Ind. Or. t. 291; Kurz For. Flor. Burm. II. 222; Clarke in Hook f. Flor. Brit. Ind. IV. 225. *N. ovata*, Wall. Cat. 1323; Choisy Convolv. Or. 110, t. 2, f. 13, and in DC. Prod. IX. 437. *N. bracteata*, Griff. Notul. IV. 285. *N. intermedia*, Griff. Notul. IV. 285.

PERAK: Larut, *Scortechini* 1483! 1489! 2071! *King's Collector* 3544! 3792! 4370! 6809! PENANG: *Wallich!* MALACCA: *Maingay* 1152! 1153! SINGAPORE: *Wallich!*—**DISTRIB.** Malabar, Borneo.

5. *EVOLVULUS*, Linn.

Small prostrate or erect herbs or undershrubs, never climbing. *Leaves* small, entire, often distichous. *Flowers* small, blueish or white,

in axillary few-flowered peduncled or sub-sessile cymes. *Sepals* 5, small, sub-equal, not enlarged in fruit. *Corolla* small, funnel-shaped or sub-rotate; limb plicate, sub-entire. *Stamens* 5, included or exserted; filaments filiform. *Ovary* 2-celled or, rarely, 1-celled; ovules 4; styles 2, free from the base, each cleft into 2 linear or sub-clavate stigmas, papillose on the inner face. *Fruit* a 4-valved, less often a 2-valved capsule, 2-celled or 1-celled. *Seeds* 4 or 2, rarely solitary, glabrous; cotyledons twice plicate.—**DISTRIB.** Species about 80, mostly tropical American; the present the only Asiatic.

EVOLVULUS ALSINOIDES, Linn. Sp. Pl. ed. II. 392. A small perennial herb; annual branches numerous, wiry, often prostrate. *Leaves* variable in shape from lanceolate to ovate, and in pubescence from sparingly silky to densely tawny or rufous-tomentose; .25 to 1 in. or occasionally 1.5 in. long, .2 to .5 in. wide; petiole absent or short, rarely .2 in. long. *Flowers* 1 to 3, on peduncles .1 in. to 1 or 1.5 in. long; bracts small, linear, hirsute, persistent; pedicels .05 to .5 in. long. *Sepals* 5, lanceolate, hirsute, .1 to .15 in. long. *Corolla* pale blue or white, transparent, .25 to .3 in. long. *Capsule* globose, .15 in. in diam., 4-valved. *Seeds* 4, glabrous. Burm. Fl. Zeyl. 9, t. 6, f. 1; Wall. Cat. 1317; Roxb. Flor. Ind. II. 105; Choisy in DC. Prod. IX. 447; Clarke in Hook f. Flor. Brit. Ind. IV. 220. *E. linifolius*, Linn. Sp. Pl. ed. II. 392; Choisy in DC. Prod. IX. 449. *E. angustifolius*, Roxb. Flor. Ind. ed. Carey & Wall. II. 107. *E. hirsutus*, Lamk Encyc. Meth. III. 538; Ill. t. 216, f. 2; Choisy in DC. Prod. IX. 447, excl. syn. Roxb. *E. sericeus*, Wall. Cat. 1315. *Convolvulus valerianoides*, Blanco Fl. Filip. 90.

NICOBARS: Kamorta, *Kurz!* **SINGAPORE:** Changi, *Ridley!*—**DISTRIB.** Cosmopolitan in the tropics.

The form recorded from the Nicobars and Singapore is the narrow-leaved form, which is *E. linifolius* Linn. In both localities it is probably an introduced weed.

6. BONAMIA, Thouars.

Large climbing shrubs. *Leaves* large ovate-cordate, entire, firm. *Flowers* medium, in axillary peduncled cymes; bracts small. *Sepals* 5, sub-equal, firm, ovate. *Corolla* infundibuliform, tube hirsute externally except opposite the sepals; limb 5-lobed, plicate. *Stamens*, 5, included, adnate to corolla-tube; filaments filiform, at least in upper part. *Ovary* 2-celled; ovules 4; style 2-fid to the middle; stigmas 2, capitate. *Fruit* a globose or ovoid capsule; valves thin, splitting irregularly at their apices. *Seeds* normally 4, glabrous or nearly so.—**DISTRIB.** Species about 30, throughout the tropics.

BONAMIA SEMIDIGYNA, Hallier f. Engl. Bot. Jahrb. XVI. 528. A large twining shrub; stems and leaves rusty-tomentose. *Leaves* ovate-cordate, entire, apex acute; length 4 in., width 2·5 in.; petiole 1·5 in. long. *Flowers* medium, in axillary sub-capitate 2-5-flowered cymes; peduncles 1 to 2 in. long, rusty-villous as are the pedicels and sepals; bracts 2·5 in. long, oblong, rusty-villous. *Sepals* 3·5 to 5 in. long, ovate-oblong, sub-acute, sub-equal. *Corolla* yellowish, wide-infundibuliform, 1·5 in. long; tube hirsute externally; limb sub-entire. *Style* 6 in. long. *Capsule* sub-globose, glabrous, 5 in. in diam., splitting into many vertical segments, hardly covered by the slightly accrescent, ovate fruiting sepals. *Seeds* sub-glabrous. Bull. Herb. Boiss. V. 1814. *Convolvulus semidigynus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 468; Wall. Cat. 1405. *Breweria cordata*, Bl. Bijdr. 722; Choisy in DC. Prod. IX. 438; Clarke in Hook. f. Flor. Brit. Ind. IV. 223. *B. Roxburghii*, Choisy Convolv. Or. III., and in DC. Prod. IX. 438; Wight, Ic. t. 1370; Dalz & Gibs. Bomb. Fl. 162. *B. madagascariensis*, Choisy Mem. Soc. Phys. Genev. 493.

PROV. WELLESLEY: at Kubang Ulu, *Curtis*! PENANG: on the coast, *Porter*! *Curtis* 1703! PERAK: Ipoh, *Curtis* 3166!—DISTRIB. S.E. Asia generally, Mascarenes.

7. CALYSTEGIA, R. Br.

Prostrate or twining perennial herbs. *Leaves* entire or lobed, glabrous or nearly so. *Flowers* medium, axillary solitary or rarely in few-flowered cymes; bracts 2, large, leafy, embracing the calyx, persistent. *Sepals* 5, ovate or oblong, the innermost 2 rather the smallest. *Corolla* funnel-shaped or campanulate; tube glabrous externally with 5 bands in centre of component petals, each with 5 pellucid lines at the base; limb sub-entire plicate. *Stamens* 5, adnate to corolla-tube, included; filaments sub-equal. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform, entire; stigma of 2 oblong lobes. *Fruit* a globose, 1-celled, 4-valved, 4-seeded capsule. *Seeds* black, glabrous or verrucose.—DISTRIB. Species 16 to 20, in warm and temperate regions.

CALYSTEGIA HEDERACEA Wall. Cat. 1328. A prostrate or climbing weed of cultivated places and hedges. *Leaves* somewhat irregular, cordate or sagittate, lobed or rarely entire, 1 to 3 in. long, 75 to 1 in. wide; petiole 1 in. long. *Flowers* axillary solitary; peduncles 1 in. long; bracts 2 ovate, 3 in. across, persistent, enclosing the calyx. *Sepals* 5, oblong, obtuse, glabrous, outer 3 in. long, inner rather smaller. *Corolla* sub-campanulate, pinkish purple, tube 1 in. long; limb plicate, sub-entire. *Capsule* ovoid, sub-acute, glabrous, 3 in. long.

Seeds glabrous. Roxb. Flor. Ind. ed. Carey & Wall. II. 94; Choisy Convolv. Or. 103, and in DC. Prod. IX. 434; Clarke in Hook. f. Flor. Brit. Ind. IV. 217. *Convolvulus Wallichianus*, Spreng. Syst. cur. post. 61.

PENANG: Porter, fide Wallich.—DISTRIB. Northern India, Afghanistan, Eastern Asia.

Possibly only a casual weed in our area.

8. HEWITTIA, W. & A.

A pubescent twining herb. *Leaves* cordate, entire angled or lobed. *Flowers* axillary solitary, or in few-flowered cymes; bracts below the calyx 2, linear-lanceolate. *Sepals* 5, acute; outer 3 wide-ovate, accrescent in fruit, inner 2 narrow-lanceolate. *Corolla* medium, yellow or white with a purple eye; tube campanulate; limb plicate. *Stamens* 5, included, adnate to corolla-tube; filaments linear with dilated bases. *Ovary* 1-celled or imperfectly 2-celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. *Fruit* a globose, 4-valved, 1-celled, normally 4-seeded capsule. *Seeds* black, glabrous.—DISTRIB. A single species, throughout the tropics of the Eastern Hemisphere and Polynesia.

HEWITTIA BICOLOR, Wight Ic. t. 835. A pubescent perennial herb; stems twining. *Leaves* cordate, entire angled or lobed, pubescent, 2 to 4 in. long; petiole .5 in. long. *Flowers* on axillary 1-few-flowered peduncles .5 to 4 in. long; bracts 2, narrow-lanceolate, .25 to .5 in. long, situated a short distance below the calyx. *Sepals* 5, the outer ovate, accrescent; the inner narrowly lanceolate, .3 to .5 in. long. *Corolla* yellow or whitish with a purple patch in lower part of tube, rather widely campanulate, 1 in. long; tube externally hirsute; lobes 5, very short. *Stamens* 5, included; filaments linear with dilated bases. *Ovary* hirsute, more or less perfectly 2-celled; ovules 4; style filiform; stigmas 2, ovate-oblong. *Fruit* a globose capsule, .25 in. in diam., 1-celled, opening by 4 valves. *Seeds* 4, black, glabrous. Wight III. t. 168; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus bicolor*, Vahl. Symb. III. 25; Bot. Mag. t. 2205; Roxb. Hort. Beng. 14; Flor. Ind. I. 475; Flor. Ind. ed. Carey & Wall. II. 57; Wall. Cat. 1410. *C. braeteatus*, Vahl Symb. III. 25. *C. involueratus*, Ker in Bot. Reg. t. 318 (not of Spreng.). *Ipomœa bicolor*, Sweet Hort. Brit. ed. 2, 372. *I. braeteata*, Bl. Bijdr. 711 (not of Willd. nor of Wight). *I. Weinmanni* Roem. & Schult. Syst. Nat. IV. 243. *Calystegia Keriana*, Sweet Hort. Brit. ed. 2, 370. *Palmia bicolor*, Endl. ex Dalz. & Gibs. Bomb. Flor. 163. *Shuteria bicolor*, Choisy Convolv. Or. 104, and in DC. Prod. IX. 435; Flor. des Serres t. 431. *Aniseia Afzelii*, G. Don Gen. Syst. IV. 295. *A. bracteata*, Hassk. Pl. Jav. Rar. 516.

PERAK : Larut, *Seorteekini* !—DISTRIB. Tropical Africa, S.E. Asia generally, Polynesia.

9. ANISEIA, Choisy.

Twining herbs. *Leaves* elliptic, mucronulate or lanceolate. *Flowers* axillary, solitary or in few-flowered cymes. *Sepals* 5, herbaceous, acuminate; outer 3 the larger, ovate, decurrent on the peduncle and accrescent in fruit; inner 2 smaller, lanceolate, unaltered in fruit. *Corolla* wide-infundibuliform; tube hirsute externally except on spaces opposite the sepals, with 5 distinct vertical bands; limb sub-entire. *Stamens* 5, adnate to corolla-tube, included; filaments filiform. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 2-celled, 4-valved capsule. *Seeds* 4, large, black, smooth.—DISTRIB. Species about 5, all confined to America but one, which is cosmopolitan in the tropics.

ANISEIA MARTINICENSIS, Choisy Convolv. Rar. 144. A slender herb creeping in wet places or climbing, glabrous or with a few adpressed hairs. *Leaves* oblong-lanceolate, apex obtuse with a mucro, base cuneate; glabrescent; .75 to 3 in. long, .5 to 1 in. wide; petiole .6 in. long. *Flowers* axillary solitary; peduncles 1 in. long, with 2 minute, persistent bracts about the middle. *Sepals* unequal, the outer ovate-acute .6 in. long, the inner narrower, green, glabrescent; in fruit accrescent at length .75 to 1 in. long, the 2 outer then sub-cordate-ovate scarious, strongly nerved, decurrent on the peduncle; the inner lanceolate. *Corolla* white, campanulate, tube 1 in. long, pubescent outside; limb 1 in. across. *Capsule* ovoid, glabrous, .5 in. long. *Seeds* with minutely strigose margins. Choisy in DC. Prod. IX. 430; Hallier f. Engl. Bot. Jahrb. XVIII. 96, and Bull. Herb. Boiss. V. 382. *A. uniflora*, Choisy Convolv. Or. 101, t. 2, f. 9, and in DC. Prod. IX. 431; Wight Ic. t. 850. *Convolvulus martinicensis*, Jacq. Am. 20, t. 17. *C. uniflorus*, Lamk Encyc. Meth. III. 544; Burm. Fl. Ind. 47, t. 21. *C. emarginatus*, Vahl Symb. III. 23. *C. Rheedei*, Wall. Cat. 1358; Roxb. Flor. Ind. ed. Carey & Wall. II. 70. *Ipomœa martinicensis*, Mez Prim. Fl. Esseq. 98. *I. uniflora*, Roem. & Schult. Symb. IV. 247; Clarke f. Flor. Brit. Ind. IV. 201. *I. lanceolata*, G. Don Gen. Syst. IV. 282.

PERAK : Kwala Dipong, *Seorteekini* 1780! Kota Bahru, *King's Collector* 1075! MALACCA : *Griffith* !—DISTRIB. Tropics generally.

10. JACQUEMONTIA, Choisy.

Climbing or twining herbs or undershrubs; stems and leaves usually pubescent. *Leaves* usually cordate or elliptic, entire or rarely toothed or lobed. *Flowers* axillary, in compound umbellate or capitate

cymes, very rarely solitary; bracts small, rarely leafy. *Sepals* 5, equal or unequal. *Corolla* usually small; tube infundibuliform with a wide or narrow throat, and with 5 vertical bands each ending in 2 distinct nerves; limb plicate. *Stamens* 5, adnate to corolla-tube, included. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigmas 2, linear or elliptic-oblong. *Fruit* a globose 2-celled capsule, usually 8-valved, rarely 4-valved. *Seeds* normally 4, usually glabrous, often slightly winged along the margins.—DISTRIB. Species 60 to 70, mostly in Brazil; 2 to 3 in S.E. Asia.

JACQUEMONTIA PANICULATA, Hallier f. Engl. Bot. Jahrb. XVI. 541; XVIII. 95. A slender climber; stems twining, puberulous. *Leaves* ovate-cordate, acute, entire, pubescent beneath, puberulous at length glabrescent above, 1.5 to 3 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* axillary, in small dense many-flowered sub-capitate cymes; peduncles puberulous, 1 to 1.5 in. long; bracts inconspicuous. *Sepals* 5, ovate-cordate, pubescent, .25 in. long, not altered in fruit. *Corolla* tubular, .5 in. long; mouth narrow, limb pink or white, shortly acutely 5-lobed. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* glabrous. *Convolvulus parviflorus*, Vahl. Symb. III. 29; Roxb. Flor. Ind. ed. Carey & Wall. II. 51; Choisy Convolv. Or. 98, and in DC. Prod. IX. 413; Clarke in Hook. f. Flor. Brit. Ind. IV. 220. *C. asclepiadeus*, Wall. Cat. 1396. *Ipomœa paniculata*, Burm. Flor. Ind. 50, t. 21, f. 3. *I. parviflora*, Pers. Synops. I. 183 (not of Vahl.).

PERAK: Kampong Kota, Wray 3337!—DISTRIB. Tropical Africa, S.E. Asia generally, Australia.

11. MERREMIA, Dennst.

Shrubs or herbs, usually climbing, rarely erect or prostrate; stems very rarely winged. *Leaves* entire, lobed, or divided. *Flowers* axillary, usually long-peduncled, solitary or in few-flowered, rarely many-flowered cymes; bracts small. *Sepals* 5, sub-equal, elliptic or lanceolate, acuminate, rarely rounded or truncate, convex, usually slightly accrescent in fruit. *Corolla* campanulate, white, less often yellow or orange, the tube with 5 vertical bands each usually marked by 5 dark-violet lines; limb plicate, margin slightly 5-lobed. *Stamens* 5, unequal, included or exerted; filaments filiform; anthers usually twisted; pollen never spinulose. *Ovary* 2-celled or occasionally 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule, 1-4-locular, sometimes the style separating with a small stopple. *Seeds* 4, rarely fewer, dull, glabrous, rarely puberulous.—DISTRIB. Species about 40, in all warm countries.

Corolla glabrous externally :—

Leaves not peltate :—

Leaves deeply 5-lobed ; flowers large 1. *M. vitifolia*.

Leaves entire or very slightly lobed ; flowers small :—

Sepals acuminate ; flowers yellow with a pink or purple eye :—

Leaves acute at apex 2. *M. hastata*.

Leaves obtuse, truncate, or 3-toothed at apex .. 3. *M. tridentata*.

Sepals obtuse : flowers without a distinct eye :—

Leaves narrow-oblong, the lower often ovate-oblong ; flowers white with pinkish tinge or yellowish-white or pale yellow 4. *M. caespitosa*.

Leaves ovate-cordate, margin often crenate or toothed ; flowers clear yellow 5. *M. convolvulacea*.

Leaves peltate ; flowers large 6. *M. nymphaeifolia*.

Corolla somewhat hirsute or shaggy externally :—

Leaves more or less hirsute ; flowers in compact corymbose or umbellate cymes 7. *M. umbellata*.

Leaves quite glabrous ; flowers in lax cymes 8. *M. crispatula*.

1. *MERREMIA VITIFOLIA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A large climber with slender hispidly hairy branches. *Leaves* cordate, palmately 5-lobed, 2 to 6 in. across ; lobes triangular acute, often toothed or again acutely lobed ; petiole .5 to 2 in. long, hispidly hairy. *Flowers* in axillary 1-7-flowered cymes ; peduncles hispidly hairy, 1 to 4 in. long, pedicels hispidly hairy, .2 to .5 in. long. *Sepals* ovate-acute, hispid, .5 in. long, in fruit somewhat enlarged, .75 in. long. *Corolla* campanulate, clear yellow, glabrous, 1.5 in. long and nearly as wide, slightly irregular. *Capsule* depressed-globose, membranous, 2-celled, normally 4-seeded. *Seeds* glabrous. Verslag. Buitenzorg, 1895, 127, and Bull. Herb. Boiss. V. 379. *Convolvulus vitifolius*, Burm. Fl. Ind. 45, t. 18, f. 1 ; Linn. Mantiss. 203 ; Roxb. Hort. Beng. 14 ; Flor. Ind. I. 476, and ed. Carey & Wall. II. 61 ; Wall. Cat. 1348. *C. angularis*, Burm. Fl. Ind. 46, t. 19, f. 2 ; Linn. Mantiss. 203 ; Hassk. Pl. Jav. Rar. 519. *Ipomœa vitifolia*, Sweet Hort. Brit. ed. II. 372 ; Blume Bijdr. 709 ; Choisy Convolv. Or. 72, and in DC. Prod. IX. 361 ; Kurz For. Flor. Burm. II. 219 ; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. angularis*, Choisy Convolv. Or. 72.

PERAK : Larut, *Scortechini* ! ANDAMANS : Port Mouat, *Kurz* ! NARCONDAM, *Prain* ! NICOBARS : Nancowry, *Prain's Collector* !—
DISTRIB. S.E. Asia generally.

2. *MERREMIA HASTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse twining biennial herb, stem angular. *Leaves* glabrous, hastate-lanceolate, 2 to 3 in. long, .3 to .5 in. wide, apex acute ; petiole very short. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves ; bracts very small, lanceolate. *Sepals* narrow,

acuminate, '3 to '5 in. long, glabrous. *Corolla* funnel-shaped, '6 in. long, pale yellow with a purple eye; limb slightly lobed. *Stamens* 5; filaments slightly hairy at the base; anthers straight. *Ovary* and style glabrous; ovary 2-celled, each cell 2-ovuled. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 117. *Convolvulus hastatus*, Desr. in Lamk Encyc. Meth. III. 547. *C. filiceaulis*, Vahl Symb. III. 24. *C. dentieulatus*, Spreng. Syst. I. 603. *C. medius*, Roxb. Flor. Ind. I. 474, and ed. Carey & Wall. II. 56; Wall. Cat. 1346 (not of Linn.). *C. Blumei*, Dietr. Syn. Pl. I. 675. *Ipomœa dentieulata*, R. Br. Prod. I. 485; Bot. Reg. t. 317 (not of Choisy). *I. filiceaulis*, Bl. Bijdr. 721; Choisy Convolv. Or. 66; DC. Prod. IX. 353. *I. Blumei*, Steud. Nomencl. I. 815. *I. angustifolia*, Clarke in Hook. f. Flor. Brit. Ind. IV. 205 (not of Jacq., nor of Choisy). Rheede Hort. Malab. XI. t. 55.

PERAK: Larut, *Seorteekini* 138! 1833! Kwala, &c., Wray 859! 1751! Sungah Ryah, *King's Collector* 996! PENANG: Batu Gaja, &c., *Deshamps*! MALACCA: *Griffith*! Tanjong Kling and Bukit Bruang, *Hervey*! PAHANG: Pekan, *Ridley*! Katapang, *Ridley* 1236! SINGAPORE: *Hullett* 69! 232! *King's Collector* 1174! *King*!—DISTRIB. Throughout S.E. Asia, Tropical Africa, and Australia.

3. *MERREMIA TRIDENTATA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A diffuse glabrous herb with a woody rootstock giving off many closely decumbent elongated stems. *Leaves* glabrous, hastate-oblong, or spatulate-linear, or sub-quadrate, '5 to '8 in. long, '15 to '5 in. wide, apex obtuse truncate or 3-toothed; petiole 0. *Flowers* 1 to 3 on wiry axillary peduncles as long as or longer than the leaves; bracts very small, lanceolate. *Sepals* ovate, acuminate, '25 to '35 in. long. *Corolla* funnel-shaped, '4 to '5 in. long, yellow with pink eye; limb slightly lobed. *Stamens* 5. *Capsule* ovoid, papery, glabrous, 2-celled. *Seeds* glabrous. Engl. Bot. Jahrb. XVIII. 116. *Convolvulus tridentatus*, Linn. Sp. Pl. 157; Roxb. Fl. Ind. I. 475, and ed. Carey & Wall. II. 56; Wall. Cat. 1347. *Evolvulus tridentatus*, Linn. Sp. Pl. ed. II. 392. *Ipomœa tridentata*, Roth Cat. Bot. II. 19; Choisy Convolv. Or. 65, and in DC. Prod. IX. 353; Clarke in Hook. f. Flor. Brit. Ind. IV. 205.

MALACCA: *Griffith* 5861/1 (K.D.)! *Maingay* 1147 (K.D.)! JOHORE: Batu Pahat, *Ridley* 11,114!—DISTRIB. India generally, Africa, Bangka.

4. *MERREMIA CÆSPITOSA*, Hallier f. Engl. Bot. Jahrb. XVI. 552. A sparsely hairy or glabrescent annual or biennial slender twining or creeping herb. *Leaves* narrowly oblong, the lower often sub-cordate and ovate-oblong, sometimes slightly hastately lobed, 1'5 to 2'5 in. long, '5 in. wide; petiole '25 to '5 in. long. *Flowers* cymose, few or many on slender peduncles 1 to 3 in. long; bracts minute, persistent. *Sepals* elliptic-obtuse, '25 in. long, margins when dry often inflexed above.

Corolla sub-campanulate, .75 in. long, white with a pinkish tinge or yellowish-white or yellow. *Ovary* 2-celled, each cell 2-ovuled. *Capsule* ovoid, .25 in. long, papery, 1-celled, with only a trace of the original dissepiment near the base. *Seeds* glabrous. Bull. Herb. Boiss. v. 382. *Convolvulus cæspitosus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 483, and ed. Carey & Wall. II. 70; Wall. Cat. 1357. *C. Bentharii*, Wall. Cat. 1393. *Hewittia cæspitosa*, Steud. Nomencl. Bot. ed. II. i. 757. *Skinneria cæspitosa*, Choisy Convolv. Or. 105, t. 6, and in DC. Prod. IV. 435. *Ipomæa linifolia*, Bl. Bijdr. 721; Choisy DC. Prod. IX. 369; Benth. Fl. Austr. IV. 423; Clarke in Hook. f. Flor. Brit. Ind. IV. 205. *I. setulosa*, Zoll. & Mor. Syst. Verzeichn. 51.

PERAK: Larut, *King's Collector* 2486! MALACCA: *Griffith*! SINGAPORE: *Kurz* 2976! *Hullett* 127! 387! *King*! *King's Collector* 1193!—DISTRIB. E. Himalaya, Indo-China, Malay Archipelago, Australia.

5. MERREMIA CONVULVULACEA, Dennst. Schl. Hort. Malab. 39. A much-twining glabrous or casually hirsute often muricated herb. *Leaves* ovate-cordate, acute, glabrous, margin usually crenate or toothed, sometimes 3-lobed, 1 to 2 in. long, .5 to 1 in. wide; petiole .5 to 2 in. long. *Flowers* numerous, rather densely cymose, on axillary peduncles .5 to 3 in. long; bracts small, caducous. *Sepals* elliptic, glabrous, .2 in. long, ultimately sub-patent, margins often at length sub-involute. *Corolla* funnel-shaped, externally glabrous, yellow, .5 to .6 in. long. *Capsule* ovoid, sub-angular, at the apex rather thicker than elsewhere and often depressed, .25 in. long; cells 2. *Seeds* puberulous. *M. hederacea*, Hallier f. Engl. Bot. Jahrb. XVIII. 168, and Verslag. Buitenzorg 1895, 126. *Evolvulus hederaceus*, Burm. Fl. Ind. 77, t. 30, f. 2. *Convolvulus flavus*, Willd. Sp. Pl. 852. *C. strictus*, Vahl Symb. III. 28. *C. dentatus*, Vahl Symb. III. 25; Roxb. Flor. Ind. ed. Carey & Wall. II. 62; Wall. Cat. 1349. *Ipomæa striata*, Poir. in Lamk Encyc. Meth. Suppl. IV. 632 (*not of* Roth). *I. dentata*, Willd. ex Roem. & Schult. Syst. IV. 789. *I. subtriflora*, Zoll. & Mor. Verzeichn. 51.

PERAK: Durian, *King's Collector* 397! Larut, *Scortechini* 1832! PAHANG: Khol, *Ridley* 2168! JOHORE: Serom, *Ridley*! SINGAPORE: *Dorward*!—DISTRIB. S.E. Asia, Africa, Australia.

6. MERREMIA NYMPHÆIFOLIA, Hallier f. Verslag. Buitenzorg, 1895, 127. A large woody climber. *Leaves* orbicular-ovate, shortly acuminate, entire, glabrous on both surfaces, peltate with a rounded or slightly retuse base, 6 to 10 in. long, 5 to 8 in. wide, the floral leaves more deeply cut and at times cordate with a narrow sinus. *Flowers* large, in loose 4-15-flowered cymes on a common peduncle sometimes shorter

than the petioles, sometimes longer than the leaves. *Sepals* broad, obtuse, coriaceous, nearly equal, in flower .75 in., in fruit nearly 1 in. long. *Corolla* wide-campanulate, 2 to 2.5 in. long, glabrous externally, yellow or white or purplish. *Stamens* 5; anthers hirsute. *Capsule* sub-globose, 1 in. in diam. *Seeds* pilose. *Ipomœa nymphaeifolia*, Bl. Bijdr. 719; Prain Journ. As. Soc. Beng. LXIII. 2, 107. *I. Rumphii*, Miq. Flor. Ind. Bat. II. 605. *I. peltata*, Choisy, Convolv. Or. 70, and in DC. Prod. IX. 359; Miq. Flor. Ind. Bat. II. 605; Benth. Flor. Austral. IV. 408; Bak. Flor. Maurit. 208. *Convolvulus peltatus*, Linn. Sp. Pl. 1194. *Spiranthera peltata*, Boj. Hort. Maurit. 226. *Operculina peltata*, Hallier f. Engl. Bot. Jahrb. XVI. 549; XVIII. 119. *Chironia lanosanthera*, Nav. & Fernand. Vill. in. Blanco Flor. Fil. ed. III. Ic. II. t. 261, f. 1.

PERAK: Pangkor, *Scortechini* 1074! *Ridley* 7158!—DISTRIB. Mascarenes, S.E. Asia, Australia, Polynesia.

7. *MERREMIA UMBELLATA*, Hallier f. Eng. Bot. Jahrb. XVI. 552; var. *orientalis*, Verslag. Buitenzorg, 1895, 132, and Bull. Herb. Boiss. V. 381. A climbing softly hairy or almost glabrous shrub, stems often 15 to 20 feet long. *Leaves* cordate or hastate, elliptic or oblong, obtuse or shortly acute, entire or very rarely sinuate or angled, nerves rather distinct, softly hairy on both surfaces, or only beneath and glabrous except the nerves above, rarely quite glabrous above and only hairy on the nerves beneath; length 1.5 to 4 in., width 1 to 3 in.; petioles often softly hairy, .2 to .6 in. long. *Flowers* in compact corymbose cymes on axillary usually softly hairy peduncles .5 to 1 in. long; pedicels .2 to 1 in. long; bracts caducous. *Sepals* elliptic, obtuse, entire or mucronate, hairy or glabrous, .25 to .3 in. long. *Corolla* tubular-campanulate, white, or white with a yellow tinge, 1 to 1.5 in. long, lobes short, at first hirsute externally. *Capsule* globose, glabrous, .3 in. wide. *Seeds* patently hirsute with blackish hairs. *Convolvulus blandus*, Roxb. Hort. Beng. 13; Flor. Ind. I. 470, and ed. Carey & Wall. II. 50, 70; Wall. Cat. 1342. *C. cymosus*, Lamk Encycl. Meth. III. 556. *C. pentagonus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 72; Wall. Cat. 1343. *C. Rothii*, Spreng. Syst. I. 600. *Ipomœa cymosa*, Roem. & Schult. Syst. IV. 241; Blume Cat. Gewachs. Buiteuz. 50; Choisy Convolv. Or. 79, and in DC. Prod. IX. 371; Bot. Reg. 1843, t. 24; Clarke in Hook. f. Flor. Brit. Ind. VI. 211. *I. bifida*, Roth Nov. Sp. 118. *I. Heynei*, Roem. & Schult. Syst. IV. 237. *I. Rothii*, Roem. & Schult. Syst. IV. 241. *I. Olanda*, Sweet Hort. Brit. ed. II. 372. *I. caliginosa*, Choisy Convolv. Or. 79, and in DC. Prod. IX. 370.

PERAK: Thaipeng, *Scortechini*! Krian, *Scortechini*! Larut, *King's Collector*! PENANG: *Wallich*! *King*! *Deschamps*! SELANGOR:

Ridley! ANDAMANS: very common. NICOBARS: Kurz! Prain!—
DISTRIB. E. and S.E. Asia, Tropical Africa.

VAR. *occidentalis*, Hallier f. Verslag. Buitenzorg 1895, 127. Leaves wide-cordate, softly hairy on both sides, 4 in. long, 3·5 in. wide; cymes umbellate; corolla yellow. *Convolvulus umbellatus*, Wall. Cat. 2329. *Ipomœa umbellata*, Mez Prim. Flor. Esseq. 99. *I. cymosa*, var. *culta*, Prain Journ. As. Soc. Beng. LXIII. 2, 108.

PERAK: Sungah Ryah, *Kunstler* 912!—DISTRIB. Bengal, naturalised; Tropical America.

8. MERREMIA CRISPATULA, Prain Beng. Pl. II. 730; VAR. *andamanica*, Prain. A large glabrous scandent herb. Leaves ovate-cordate, acuminate, margins entire or faintly undulate, glabrous on both surfaces, 3 to 4 in. long, 2·5 to 4 in. wide; petiole 1 to 1·5 in. long. Flowers in axillary few-flowered cymes, peduncles 1·5 to 2 in. long, pedicels ·75 to 1·25 in. long, thickened upwards. Sepals orbicular, ·5 in. long, in fruit ·75 in. long. Corolla campanulate, limb hardly lobed, tube hirsute externally, yellow, 1·25 in. long. Capsule sub-orbicular, ·75 in. across. Seeds minutely velvety, margins somewhat shaggy. *Ipomœa petaloidea*, var. *andamanica*, Prain Journ. As. Soc. Beng. LXIII. 2, 110.

ANDAMANS: S. Andaman, common.

This is in all probability specifically distinct from *Merremia crispata* (*Ipomœa petaloidea*, Choisy), but it seems preferable to treat it for the moment as a variety of that species and not as a new species, because of its remarkable resemblance to *Merremia Riedeliana*, Hallier f. (*Ipomœa Riedeliana*, Oliv.), and *Merremia mammosa*, Hallier f. (*Ipomœa mammosa*, Choisy). From the former, as described and figured by Oliver, this differs in having a 4-celled ovary with 1 ovule in each cell, whereas *M. Riedeliana* has a 2-celled ovary with 4, sometimes 5, ovules in each cell. From *M. mammosa*, as figured by Rumphius, this differs in having obtuse calyx-lobes and a shaggy corolla; Rumphius' figure shows the sepals acute and the corolla glabrous. This plant appears to be the same thing as *Convolvulus platypeltis*, Span., from Timor, and if it proves to be distinct alike from *M. Riedeliana* and *M. mammosa*, which last is cited by Dr. Hallier as an Andaman plant, though we have no authentic example of *M. mammosa* from the Andamans at Calcutta, the name it should bear will be *Merremia platypeltis*.

12. OPERCULINA, Manso.

Large herbaceous climbers; stems, peduncles and petioles usually winged. Leaves large, entire or lobed, rarely peltate. Flowers large, showy, axillary, solitary or often in few-flowered cymes. Sepals 5, large, ovoid, glabrous, accrescent in fruit and ultimately irregularly splitting from the tip. Corolla infundibuliform, rarely campanulate; tube with 5 vertical smooth bands. Stamens 5; filaments filiform; anthers large, at length contorted; pollen never spinulose. Ovary 2-celled, glabrous; ovules 4; style filiform; stigma 2-globose. Fruit a capsule, not

opening by valves; the epicarp circumscissile above the middle, the cap in separating carrying away the style; the endocarp at first entire, at length rupturing irregularly. *Seeds* usually solitary, rarely more than one, black, smooth or furred, usually large.—DISTRIB. Species 15, tropics generally.

Stems winged; bracts large, coloured; flowers white or pale yellow;

leaves softly pubescent, not palmate 1. *O. Turpethum*.

Stems not winged; bracts small: flowers brilliant yellow; leaves glabrous, deeply palmately lobed 2. *O. tuberosa*.

1. OPERCULINA TURPETHUM, Manso En. Pl. Bras. 16, n. 49. A stout softly pubescent climber, with strong twining 4-angled or compressed less often sub-cylindric winged stems, wings membranous. *Leaves* large, ovate or oblong, obtuse or acute, 2 to 5 in. long, 1 to 3 in. wide, base cordate or truncate; petiole 1 in. long. *Flowers* axillary, in few-flowered cymes; peduncles 1 to 4 in. long; bracts oblong, 1 in. long, sometimes pinkish-purple, caducous. *Sepals* 5, ovate, softly pubescent, .5 in. long; in fruit accrescent orbicular, concave, scarious and fissile, 1 in. long. *Corolla* white or pale yellow, tubular-campanulate, 1.5 in. long. *Stamens* 5, included, anthers at length contorted. *Capsule* globose, .5 to .75 in. across. *Seeds* 4 or fewer, glabrous. Hallier f. Engl. Bot. Jahrb. XVIII. 120, and Verslag. Buitenzorg, 1895, 128. *Convolvulus Turpethum*, Linn. Sp. Pl. 155; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 57, and Flor. Ind. I. 476; Wall. Cat. 1371; Bot. Mag. t. 2093; Hassk. Pl. Jav. Rar. 518. *C. anceps*, Linn. Mantiss. 43. *C. triquetra*, Vahl Symb. III. 30. *Ipomœa Turpethum*, R. Br. Prod. I. 485; Bot. Reg. t. 279; Chois. Convolv. Or. 68, and in DC. Prod. IX. 360; Kurz For. Flor. Burm. II. 218; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. anceps*, Roem. & Schult. Syst. IV. 231; Bl. Bijdr. 714; Choisy Convolv. Or. 68, and in DC. Prod. IX. 360. *I. triquetra*, Roem. & Schult. Syst. IV. 231. *Spiranthera Turpethum*, Boj. Hort. Maurit. 226. *Argyreia alulata*, Miq. Flor. Ind. Bat. II. 587.

ANDAMANS: Narcondam, Prain! NICOBARS: Kamorta, Kurz! MALACCA: Griffith!—DISTRIB. E. Africa, S.E. Asia, Australia, Polynesia.

2. OPERCULINA TUBEROSA, Meissn. in Mart. Fl. Bras. VII. 212. A stout glabrous climber with strong twining smooth or muricate stems. *Leaves* large, ovate, deeply palmately lobed; lobes elliptic-lanceolate, acuminate, entire, 3 to 5 in. across; petiole 2 to 5 in. long. *Flowers* axillary in many-flowered cymes; peduncles 2 to 6 in. long; bracts deciduous; pedicels .25 to 1 in. long. *Sepals* 5, elliptic-oblong, obtuse; accrescent in fruit and spreading, ultimately 2 in. long, 1 to 1.5 in. wide. *Corolla* yellow, tubular-campanulate, 2 in. long. *Stamens* 5, included,

anthers twisted. *Capsule* globose, .3 in. wide; peduncle somewhat thickened. *Seeds* furred along the angles. Hallier f., in Engl. Bot. Jahrb. XVI. 476, 549; XVIII. 119; Verslag. Buitenzorg 1895, 128, and Bull. Herb. Boiss. VII. 410. *Ipomœa tuberosa*, Linn. Sp. Pl. 160; Choisy in DC. Prod. IX. 362 (*partly*).

SINGAPORE: *Hullett* 645, in cultivation.—DISTRIB. America, Africa, India, Malaya, New Caledonia.

LEPISTEMON, Bl.

Stout climbing herbs, with villous stems. *Leaves* cordate, often more or less lobed. *Flowers* in very dense axillary cymes; bracts narrow, deciduous. *Sepals* 5, sub-equal, herbaceous, hispid or glabrous, acute or obtuse. *Corolla* small, yellowish-white; tube hirsute externally, narrowed and shortly cylindric at base, urceolate above; limb shortly 5-lobed. *Stamens* 5, included; filaments dilated at their bases into 5 sub-equal, concave scales arched over the ovary; *disk* large cupular. *Ovary* 2-celled; ovules 4; style very short; stigma 2-partite, sub-capitate. *Fruit* a 4-valved capsule. *Seeds* glabrous.—DISTRIB. Species 3, S.E. Asiatic and African.

LEPISTEMON FLAVESCENS, Bl. Bijdr. 722. A climber with stout fulvous-villous stems. *Leaves* ovate-cordate, acute, entire or often distinctly 3-lobed, densely tawny-tomentose on both surfaces; 3 to 5 in. wide; petiole 1 to 2 in. long. *Flowers* yellowish-white in closely 10–30-flowered axillary cymes, sessile or on short peduncles .25 to .5 in. long; bracts tawny-hirsute, .2 in. long, deciduous. *Sepals* 5, rather narrowly ovate to lanceolate, sub-acute to rather finely acuminate, densely patently sub-strigose, .35 to .4 in. long. *Corolla* narrow and hyaline at the base, membranous and from slightly to widely urceolate above; tube hirsute externally; limb widely infundibuliform. *Stamens* 5, the basal processes papillose or hirsute, included in the lower part of the corolla-tube and overarching the short style; filaments glabrous, included in the upper part of the corolla-tube. *Ovary* 2-celled; ovules 4; style very short; stigma 2-lobed, lobes sub-globose. *Capsule* ovoid, glabrous, 2-celled, 4-valved, .25 in. long, normally 4-seeded. *Seeds* glabrous. Miq. Flor. Ind. Bat. II. 629; Prain Journ. As. Soc. Beng. LXIII. 2, 111; Wight Ic. t. 1362; Choisy in DC. Prod. IX. 348. *L. Walliehii*, Choisy Convolv. Or. 61, and in DC. Prod. IX. 348; Clarke in Hook. f. Flor. Brit. Ind. IV. 216. *Convolvulus cephalanthus*, Wall. Cat. 1402. *C. binectariferus*, Wall. in Roxb. Flor. Ind. ed. Carey & Wall. II. 47. *Vallaris controversa*, Spreng. Syst. cur. post. 65. *Ipomœa Walliehii*, Steud. Nomencl. Bot. *Nemodon* sp., Griff. Notul. IV. 286.

PERAK : Larut, *Scortechini* n. 1544 ! Goping, *King's Collector* 987 ! 1059 !—DISTRIB. Assam, Tenasserim, Chittagong, Java, Borneo, Philippines.

The three gatherings from Perak agree with each other in every respect. They differ from the plant as it occurs in Tenasserim, in having a more widely urceolate corolla and even longer and more lanceolate sepals ; at the same time they differ from the plant as it occurs in the Malay Archipelago, in having the sepals narrowly lanceolate and acuminate, instead of ovate and sub-acute. As regards corolla, however, they are exactly like the species as it occurs elsewhere in Malaya. Since the Perak plant combines the characters of the two previously recognised species—*L. Wallichii* with long acuminate sepals and *L. flavescens* with wide-urceolate corolla—it appears to afford conclusive proof of the suggestion already made by Clarke, *l.c.*, that the Assamese and the Malayan plants are no more than forms of one somewhat variable species. An Indian form occurs in Travancore ; this has been characterised by Stapf as a distinct species, *L. leiocalyx*, probably quite justly, since the Travancore plant has quite glabrous and obtuse sepals : the same form occurs in Chittagong ; otherwise, however, the Indian plant agrees with the forms reported from Indo-China and Malaya.

IPOMÆA, Linn.

Herbs, rarely shrubs, twining or prostrate, less often sub-erect or erect. *Leaves* alternate, entire lobed or divided. *Flowers* axillary, solitary or in cymes, the cymes rarely paniculate, or in terminal spikes ; bracts various. *Sepals* 5, ovate or linear, equal or unequal. *Corolla* campanulate or infundibuliform ; limb plicate, very slightly 5-lobed. *Stamens* 5, included or very rarely exerted ; filaments filiform or dilated at the base, often somewhat unequal ; anthers straight or contorted ; pollen spinulose. *Ovary* 1–3-celled, rarely 4-celled ; ovules 4, rarely 6 ; style filiform ; stigma capitate, entire or 2–3-globose, rarely stigmas 2, linear. *Fruit* a 4–6-valved capsule, rarely indehiscent. *Seeds* 4, less often 6, rarely solitary, glabrous, bearded, or uniformly velvety or woolly.—DISTRIB. Species about 300, throughout the tropics.

Leaves softly pubescent or densely hirsute on both surfaces :—

Leaves deeply 5–7-lobed ; flowers densely capitate with a whorl of involucre bracts 1. *I. Pes-Tigridis*.

Leaves entire or slightly 3-lobed ; flowers in congested cymes, with often one of the bracts foliaceous 2. *I. Leari*.

Leaves glabrous or only slightly hirsute or pubescent :—

Leaves all deeply 5- or more-lobed, glabrous :—

Leaves digitately 5-lobed, lobes nearly if not quite distinct at the base ; flowers more or less white 3. *I. pulchella*.

Leaves palmately 5–7-lobed, lobes not as a rule more than three-fourths cut to the base ; flowers purplish-pink 4. *I. paniculata*.

Leaves entire or slightly lobed or if (rarely) deeply lobed the lobes only 2 :—

Flowers in few-flowered axillary cymes :—

Cymes corymbose and lax or flowers 2 or solitary :—

Terrestrial, firm-stemmed plants :—

Flowers purple :—

Leaves ovate-cordate, acute or acuminate, entire or more or less lobed :—

Cultivated species with tuberous edible roots, often without flowers, rarely with seeds .. 5. *I. Batatas*.

Wild plants or if grown in gardens with the roots not edible :—

Large stout climbers on bushes near sea-coasts; flowers large, 4 in. long; sepals obtuse 6. *I. illustris*.

Slender climbers; flowers never more than 1·5 in. long; sepals acute or acuminate :—

Climbing or trailing herbs on sea-beaches; flowers 1·5 in. long 7. *I. denticulata*.

Climbing herbs in gardens, or garden escapes; flowers ·5 in. long .. 8. *I. triloba*.

Leaves oblong, obtuse or 2-lobed; littoral sand-binding creepers 9. *I. Pes-Capræ*.

Flowers white or yellowish-white; leaves oblong or linear-oblong, emarginate, sometimes lobed, occasionally lyrate; littoral sand-binding creepers .. 10. *I. littoralis*.

Aquatic or palustrine herbs; stems soft, thick and spongy, trailing and rooting on wet mud or floating in ponds and ditches; flowers purple .. 11. *I. reptans*.

Cymes subumbellate, dense; flowers pale purple, or white with a darker purple eye .. 12. *I. sagittæfolia*.

Flowers in many-flowered rather condensed axillary panicles; flowers white, slightly tinged with pink .. { 13. *I. staphylina*,
VAR. *malayana*.

1. *IPOMŒA PES-TIGRIDIS*, Linn. Sp. Pl. 162. A hirsute twining herb; stems patently hirsute. *Leaves* hirsute on both surfaces, deeply 5–9-lobed, lobes elliptic, acuminate, narrowed at the base; length 1 to 5 in., width 1 to 4 in.; petiole 1 to 2 in. long. *Flowers* densely capitate, on axillary hirsute peduncles ·5 to 3 in. long; the heads surrounded by a whorl of fulvous-hirsute bracts, the outer ovate or elliptic-oblong with cuneate or rounded bases 1 in. long, the inner narrower acute ·5 to ·75 in. long. *Sepals* lanceolate, acute, tawny-hirsute, ·3 to ·5 in. long, scarcely altered in fruit. *Corolla* 1·25 in. long, sparsely strigose externally, infundibuliform with rather narrow tube and abruptly widened mouth, pink. *Capsule* ovoid, ·25 in. long, glabrous, chartaceous. *Seeds* minutely velvety. Roxb. Flor. Ind. ed. Carey & Wall. II. 93; Bl. Bijdr. 709; Wight Ic. t. 836; Choisy Convolv. Or. 73, and in DC. Prod. IX. 363; Clarke in Hook. f. Flor. Brit. Ind. IV. 204; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus Pes-Tigridis*, Spreng. Syst. I. 592; Wall. Cat. 1374. *C. bryoniaefolius* Salisb. Prod. 125. *Convolvuloides palmata*, Moench. Meth. 452. Rheede Hort. Malab. XI. t. 59.

MALACCA: *Griffith!*—DISTRIB. Tropical Africa, S.E. Asia generally.

2. *IPOMŒA LEARI*, Paxt. Bot. Mag. VI. 267. A large hirsute climber, with perennial root. *Leaves* widely or deeply cordate, acute, entire or slightly 3-lobed, softly sparingly hirsute above, more densely beneath; length 3 to 6 in., width 2 to 5 in.; petiole hirsute, 2 to 3 in. long. *Flowers* in congested 3–7-flowered cymes on axillary softly pubescent peduncles 3 to 7 in. long; bracts linear acuminate .3 to .4 in. long, with casually a foliaceous bract 1.5 in. long, .3 to .5 in. wide, with a cuneate, less often sub-cordate base, close to the flowers. *Sepals* lanceolate, acuminate, .75 in. long, pubescent. *Corolla* abruptly campanulate from a narrow cylindric base, tube 2.75 to 3 in. long, purple-blue or mixed red and blue, changing with age. *Fruit* not seen. *I. congesta*, Prain Journ. As. Soc. Beng. LXIII. 2, 104 (not of R. Br.). *Pharbitis Learii*, Hook. Bot. Mag. t. 3928; Choisy in DC. Prod. IX. 343.

SINGAPORE: *Hullett!*—DISTRIB. Cultivated throughout the tropics, native of America.

Mr. Hullett, whose plant was probably an escape, notes on his specimen (*Hullett* 646): “January, 1885: blue convolvulus, wild? Have never seen it in seed.”

3. *IPOMŒA PULCHELLA*, Roth Nov. Sp. 115. A glabrous twining herb. *Leaves* glabrous, digitate, 5-lobed, lobes ovate-acute, base cuneate, central largest 1.25 to 1.5 in. long, .5 to .75 in. wide, basal smallest .5 to .75 in. long, .3 to .5 in. wide; petiole glabrous, .75 to 2 in. long. *Flowers* in axillary 1–3-flowered cymes; peduncles .25 to 1.25 in. long; bracts minute, deciduous; pedicels .5 in. long, with small ovate sub-persistent bracteoles below the middle. *Sepals* ovate, glabrous, .2 to .25 in. long, the inner obtuse, the outer sub-acute. *Corolla* campanulate, 2 in. long, white or with a tinge of rose. *Capsule* globose, glabrous, .5 in. wide. *Seeds* villous. Wight Ic. 158; Choisy in DC. Prod. IX. 386. *I. palmata* Clarke in Hook. f. Flor. Brit. Ind. IV. 386 in part (not *I. palmata*, Forsk. = *I. cairica*, Sweet).

MALACCA: *Maingay*. SINGAPORE: Tanglin, *Ridley* 5817!—DISTRIB. India, Indo-China.

Mr. Ridley's specimens may be from plants escaped from cultivation; they are noted as “from behind the stable, Tanglin.” This is one of two species often cultivated in India under the name of the “Railway Creeper”; the other species so termed is the American *Merremia quinquefolia*, Hallier f.; the latter we have not yet received from the Malay peninsula, though it has already escaped and become domesticated near Port Blair in the Andanans.

4. *IPOMŒA PANICULATA*, R. Br. Prod. I. 486. A large scandent perennial climber with a tuberous root; stems glabrous. *Leaves* palmately 5–7-lobed, glabrous, the lobes sometimes cut almost to

the base, lanceolate or elliptic, often spathulate; length 3 to 7 in., width 2·5 to 6 in.; petiole 2 to 5 in. long. *Flowers* in many-flowered axillary cymes, on peduncles 2 to 6 in. long; pedicels ·25 to ·75 in. long; bracts deciduous. *Sepals* elliptic, shortly acute, glabrous, ·25 to ·3 in. long, enlarged and concave in fruit, ·4 to ·5 in. long. *Corolla* 1·5 to 2·25 in. long, glabrous externally, wide-campanulate, purplish-pink. *Stamens* 5, anthers straight. *Ovary* 4-celled for three-fourths of its height or throughout. *Capsule* ovoid, ·3 in. long, 4-celled throughout, 4-valved. *Seeds* woolly with long hairs which protrude from the chinks of the capsule. Bl. Bijdr. 709; Bot. Reg. t. 62; Hallier f. Bull. Herb. Boiss. V. 379. *Convolvulus panieulatus*, Linn. Sp. Pl. 223; Roxb. Flor. Ind. I. 478, and ed. Carey & Wall. II. 63; Wall. Cat. 1350; Spreng. Syst. I. 591. *C. platensis*, Spreng. Syst. I. 591. *C. insignis*, Spreng. Syst. I. 592. *C. roseus*, Kunth in Humb. & Bonpl. III. 108 (not of Miller). *Ipomœa digitata*, Linn. Syst. ed. X. 924; Meissn. in Mart. Fl. Brasil. VII. 278; Choisy in DC. Prod. IX. 389; Clarke in Hook. f. Flor. Brit. Ind. IV. 202. *I. mauritiana*, Jacq. Hort. Schoenbr. II. 39, t. 200. *I. gossypifolia*, Willd. Enum. Hort. Berol. 208. *I. eriosperma*, Beauv. Fl. Owar. & Benin II. 73, t. 105. *I. insignis*, Andr. Bot. Rep. t. 665; Bot. Reg. t. 75; Bot. Mag. t. 1790. *I. tuberosa*, G. F. W. Mey. Prim. Fl. Esseq. 102. *I. platensis*, Ker-Gawl. Bot. Reg. t. 333; Bot. Mag. t. 3685; Choisy in DC. Prod. IX. 387. *Batatas panieulata*, Choisy Convolv. Or. 54, t. 1, f. 2, and in DC. Prod. IX. 339; Wight Madr. Journ. Lit. IV. t. 11. *B. edulis*, var. γ , Choisy in DC. Prod. IX. 339.

PERAK: *Seortechini*! PENANG: *Wallieh* 1350! *Deshamps*! SINGAPORE: Chan-chu-kang, *Ridley* 3909!—DISTRIB. Cosmopolitan in the tropics.

5. IPOMŒA BATATAS, Lamk Encycl. Meth. VI. 14. A trailing or twining glabrous or sparingly hairy herb with tuberous roots; tubers red, white, or occasionally yellow. *Leaves* ovate-cordate, acute, entire or angular or somewhat lobed; 2 to 4 in. long, 2 to 3·5 in. wide; petiole 2 to 5 in. long. *Flowers* in few-flowered cymes, very often none produced, on axillary peduncles 1 to 4 in. long; pedicels ·25 to ·5 in. long; bracts small, lanceolate, deciduous. *Sepals* narrowly oblong, acute, the outer shorter, ·5 to ·6 in. long. *Corolla* 1 to 2 in. long, purplish, glabrous externally, campanulate. *Stamens* 5, filaments slightly hirsute at the base. *Ovary* 4-celled, glabrous, half-enveloped by the undulate disk. *Capsule* 4-celled, or casually 3-1-celled by suppression. *Seeds* glabrous. Bl. Bijdr. 712; Meissn. in Mart. Fl. Brasil. VII. 282; Clarke in Hook. f. Flor. Brit. Ind. IV. 202; Hallier f. Bull. Herb. Boiss. V. 380. *I. Catesbæi*, G. F. W. Mey. Prim. Fl.

Esseq. 103. *Convolvulus Batatas*, Linn. Sp. Pl. 154; Roxb. Flor. Ind. I. 483, and ed. Carey & Wall. II. 69; Wall. Cat. 1356. *C. indicus*, Moris. Hist. II. sect. I. t. 3, f. 4. *C. edulis*, Thunb. Fl. Japon. 84. *C. esculentus*, Salisb. Prod. 123. *Batatas edulis*, Choisy Convolv. Or. 53, and in DC. Prod. IX. 338. *B. xanthorrhiza* Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 130. Rheede Hort. Malab. VII. t. 50.

PERAK: Larut; *Seortechini* 1836! but doubtless also present in other provinces, cultivated.

The Sweet Potato; very rarely seen in flower, still more rarely in fruit. A native of America, but now grown throughout the tropics.

6. *IPOMŒA ILLUSTRIS*, Prain Beng. Pl. II. 735. A glabrous climber. *Leaves* ovate or oblong, cordate or hastate, entire, glabrous, apex acuminate; nerves rather prominent; 4 to 6 in. long, 3·5 to 5 in. wide; petiole 1·5 to 2 in. long. Flowers in axillary cymes; peduncles 1 to 1·5 in. long, usually 2–3-flowered, often 1-flowered; bracts caducous; pedicels ·5 to 1·5 in. long. *Sepals* orbicular, obtuse, glabrous, ·3 to ·4 in. long. *Corolla* rather wide-campanulate, purple, 4 to 4·5 in. long, glabrous, limb 3 in. wide. *Capsule* ·5 in. wide, globose. *Seeds* with long silky hairs. *I. campanulata* var. *illustris*, Clarke in Hook. f. Flor. Brit. Ind. IV. 211.

ANDAMANS: on the coasts, everywhere. PENANG: Pulo Boetong, Curtis 1970!—DISTRIB. Coasts of Ceylon, Sunderbuns, Indo-China, and Malay Archipelago.

This is very nearly allied to *I. campanulata*, Linn., which appears, however, to be always an inland species, whereas this is always a littoral plant. *I. illustris* differs further in having flowers at least one-half larger, sepals quite glabrous, and fewer flowers to the cyme.

7. *IPOMŒA DENTICULATA*, Choisy in DC. Prod. IX. 379 (*not of* R. Br.). A glabrous trailing or twining littoral herb. *Leaves* ovate-cordate, acute, entire denticulate angled or sub-lobate, base rather deep-cordate with an obtuse sinus, firm in texture but hardly fleshy; 1 to 2·5 in. long, ·75 to 1·75 in. wide; petiole 1·5 in. long. *Flowers* axillary on short 1–3-flowered peduncles, never more than 1·5 in. long; pedicels (often only one) 1 to 1·25 in. long; bracts ·2 in. long, linear. *Sepals* elliptic, abruptly acute, sub-scarious, ·4 in. long. *Corolla* 1·5 in. long, tube funnel-shaped, abruptly widening at the mouth, purple. *Ovary* 2-celled. *Capsule* globose, ·3 in. in diam., glabrous. *Seeds* smooth. Benth. Fl. Austr. IV. 421; Clarke in Hook. f. Flor. Brit. Ind. IV. 298; Hallier f. Engl. Bot. Jahrb. XVI. 554. *I. littoralis*, Bl. Bijdr. 713 Thw. Enum. 211 (*not of* Boiss.). *I. subdentata*, Miq. Fl. Ind. Bat. II. 614. *I. eymosa*, Bak. Fl. Maurit. 208 (*not of* Roem. & Schult.). *I.*

nicobarica, Kurz in Journ. As. Soc. XLV. 2, 141. *Convolvulus denticulatus*, Lamk Encycl. Meth. III. 540.

PERAK: Dindings, *Seortechini* 1066! *Curtis* 3449! PENANG: Bagian Jumal, *Curtis* 1974! PAHANG: Rumpin, *Ridley*! NICOBARS: common. ANDAMANS: very common.—DISTRIB. Coasts of the Indian and Pacific Oceans, from the Seychelles to Polynesia.

This species, in the writer's experience, prefers shingle beaches, though occasionally it is to be met with on sandy beaches along with *I. biloba*.

8. *IPOMŒA TRILOBA*, Linn. Sp. Pl. 229. A twining or prostrate herb with glabrous slightly angular stem. *Leaves* cordate, acuminate to an often rounded tip, entire or toothed or occasionally 3-lobed; 1·5 to 2 in. long, 1·25 to 1·75 in. wide; petiole slender, 1·75 to 2 in. long. *Flowers* in axillary 1-4-flowered cymes; peduncles 1 to 1·5 in. long; bracts lanceolate, ·2 in. long, deciduous; pedicels ·25 to ·35 in. long. *Sepals* lanceolate, acuminate, ciliate with spreading yellowish hairs, ·35 in. long. *Corolla* tubular, purple, ·5 in. long. *Capsule* pilose. Choisy in DC. Prod. IX. 383.

SINGAPORE: *Hullett*!—DISTRIB. Cultivated in the tropics; native of America.

Under his n. 68, Mr. Hullett sent to Calcutta, in 1884, as *Ipomœa coccinea*, a mixture of two species, one of which is *Quamoclit phanicea*, the other being *Ipomœa triloba*; as they are not noted as cultivated it seems possible that *I. triloba* may at least casually occur as an escape at Singapore. For the detection of this mixture, which had not been observed by the writer when arranging the Calcutta *Convolvulaceæ* in 1894 (see Journ. As. Soc. Beng. LXIII. 2, 83 *et seq.*), we are indebted to Dr. H. Hallier.

9. *IPOMŒA PES-CAPRÆ*, Roth Nov. Sp. 109. A glabrous extensive sand-binding creeper. *Leaves* orbicular or oblong, obtuse emarginate or 2-lobed; 1 to 4 in. long and sometimes wider than long; thick, fleshy, when dry distinctly nerved; petiole 1 to 4 in. long. *Flowers* in axillary 1-3-flowered cymes; peduncles 1 to 4 in. long; bracts ·2 in. long, lanceolate, deciduous; pedicels ·75 to 1·5 in. long. *Sepals* ovate, obtuse, glabrous, ·5 to ·6 in. long, slightly enlarged in fruit. *Corolla* tubular-campanulate, glabrous, 2 in. long, purple. *Capsule* ovoid, glabrous, ·5 in. long. *Seeds* villous. Choisy Convolv. Or. 63, and in DC. Prod. IX. 349; Meissn. in Mart. Fl. Brasil. VII. 256; Hallier f. Bull. Herb. Boiss. V. 381. *I. biloba*, Forsk. Flor. Ægypt-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 212. *I. maritima*, R. Br. Prod. 486; Bl. Bijdr. 720; Bot. Reg. t. 319. *Convolvulus Pes-Capræ*, Linn. Sp. Pl. 159; Roxb. Hort. Beng. 14, Flor. Ind. I. 486, and ed. Carey & Wall. II. 74; Wall. Cat. 1360. *C. maritimus*, Lamk Encyc. Meth.

III. 550. *C. bilobatus*, Roxb. Hort. Beng. 14, Flor. Ind. I. 485, and ed. Carey & Wall. II. 73; Wall. Cat. 1359. *Batatas maritima*, Boj. Hort. Maurit. 225. Rumph. Herb. Amboin. V. t. 159, f. 1. Rheede Hort. Malab. XI. t. 57.

PENANG: on the coast, *Deschamps*!—DISTRIB. Sea-shores of all tropical countries.

10. *IPOMŒA LITTORALIS*, Boiss. Fl. Orient. IV. 112. A glabrous or slightly puberulous sand-binding creeper. *Leaves* oblong, emarginate or lobed, often deeply so, and sometimes linear-oblong or linear or sub-lyrate, nerves very obscure; length 1·25 to 1·5 in., width ·25 to ·75 in.; petiole 1 in. long. *Flowers* in axillary 1–3-flowered cymes; peduncles 1 in. long; bracts ·2 in. long, linear-lanceolate, sub-persistent; pedicels in fruit slightly clavate, ·75 to 1 in. long. *Sepals* ovate-obtuse or ovate-lanceolate, ·6 in. long, obtuse with or without a terminal mucro. *Corolla* white or yellowish-white, 1·75 to 2 in. long, campanulate. *Capsule* ovoid, glabrous, ·4 in. long. *Seeds* villous. Hallier f. Engl. Bot. Jahrb. XVI. 555. *I. carnosa*, R. Br. Prod. 485; Benth. Fl. Austral. IV. 419; Clarke in Hook. f. Flor. Brit. Ind. IV. 213. *I. acetosæfolia*, Roem. & Sch. Syst. IV. 246; Meissn. in Mart. Fl. Brasil. VII. 255, t. 94. *I. longifolia*, Benth. Pl. Hartweg. 16; Bot. Reg. 1840, t. 21. *Convolvulus littoralis*, Linn. Sp. Pl. 227. *C. acetosæfolius*, Vahl Eclog. I. 18. *C. arenarius*, Vahl Symb. I. 18. *C. carnosus*, Spreng. Syst. I. 609. *C. stoloniferus*, Cyril. Pl. Rar. I. t. 5. *Batatas littoralis*, Choisy Convolv. Or. 124, and in DC. Prod. IX. 337. *B. acetosæfolia*, Choisy in DC. Prod. IX. 338.

MALACCA: *Griffith*. PAHANG: Rumpin, *Ridley*!—DISTRIB. Sea-shores of all tropical countries.

11. *IPOMŒA REPTANS*, Poir. Encyc. Meth. Suppl. III. 460. An annual glabrous aquatic, stems prostrate on mud or floating on the surface of ditches and pools, hollow and spongy, rooting at the nodes below. *Leaves* elliptic-oblong, or cordate or hastate or oblong or lanceolate, entire or angular or sub-lobate; 3 to 6 in. long, 1 to 2·5 in. wide; petiole 1 to 6 in. long. *Flowers* in axillary 1–5-flowered cymes; peduncles 2 to 7 in. long; bracts inconspicuous; pedicels 1 to 2 in. long. *Sepals* ovate, obtuse, glabrous or faintly puberulous, ·4 in. long. *Corolla* 2 in. long, purple, infundibuliform-campanulate. *Capsule* ovoid, glabrous, ·3 in. long, 2–4-seeded. *Seeds* glabrous or very minutely closely silky. Bl. Bijdr. 714; Choisy Convolv. Or. 62, and in DC. Prod. IX. 349; Hallier f. Bull. Herb. Boiss. V. 380. *I. aquatica*, Forsk. Flor. Ægypt.-Arab. 44; Clarke in Hook. f. Flor. Brit. Ind. IV. 210. *I. repens*, Roth Nov. Sp. 110; Bl. Bijdr. 713. *I. subdentata*, Miq. Flor. Ind. Bat. II. 614. *Convolvulus reptans*, Linn. Sp. Pl. 158; Roxb. Hort. Beng. 14. *C. repens*,

Vahl Symb. I. 17; Roxb. Fl. Ind. I. 432, and ed. Carey & Wall. II. 68; Wall. Cat. 1355 (*not of Linn.*). *C. Adansonii*, Lamk Encyc. Meth. III. 560. Rumph. Herb. Amboin. V. t. 155, f. 1. Rheede Hort. Malab. XI. t. 52.

ANDAMANS: Port Blair, *Prain!* and probably in some of the other provinces.—DISTRIB. Tropics of the Eastern Hemisphere.

12. *IPOMŒA SAGITTÆFOLIA*, Burm. Flor. Ind. 50. A perennial glabrous or at times pubescent or hirsute twining herb. *Leaves* ovate-cordate, acute, glabrous or sometimes pubescent, entire or sinuate, rarely lobed, basal lobes usually rounded; length 1 to 2·5 in., width ·75–2 in.; petiole 1 to 2 in. long. *Flowers* in axillary peduncled sub-umbellate cymes; peduncles ·5 to 7 in. long; bracts small, lanceolate, caducous; pedicels ·3 to ·5 in. long, in fruit thickened and clavate. *Sepals* ovate, sub-obtuse, slightly puberulous, ·2 in. long, when dry slightly muriculate externally. *Corolla* pale purple or white with a purple eye, 1·5 to 2 in. long; tube cylindric, limb abruptly explanate. *Capsule* ·25 to ·3 in. long, ovoid, 2–4-seeded. *Seeds* furred. *I. sepiaria*, Koen. ex Roxb. Hort. Beng. 14, Flor. Ind. I. 500, and ed. Carey & Wall. II. 90; Choisy Convolv. Or. 82, and in DC. Prod. IX. 370, Wight Ic. t. 838; Clarke in Hook. f. Flor. Brit. Ind. IV. 209. *I. striata*, Roth Nov. Sp. 111. *I. Heynei*, Wall. Cat. 1387. *Convolvulus maximus*, Vahl Symb. III. 26. *C. strictus*, Vahl Symb. III. 27. *C. marginatus*, Lamk Encyc. Meth. III. 558. *C. sepiarius*, Wall. Cat. 1384. *C. inerassatus*, Wall. Cat. 1386. Rheede Hort. Malab. XI. t. 53.

KEDAH: at 100 feet elevation, *King's Collector* 1705! MALACCA: Merliman Road, *Derry* 353! SINGAPORE: *Ridley* 6660! 11261!—DISTRIB. S.E. Asia generally.

13. *IPOMŒA STAPHYLINA*, Roem. & Schult. Syst. IV. 249; var. *malayana*, Prain Journ. As. Soc. Beng. LXIII. 2. 106. A glabrous scandent shrub over 90 feet long. *Leaves* glabrous, rather thick, dull green on both surfaces, sub-acute rather prominently veined; 2·5 to 4 in. long; petiole 1 to 2 in. long. *Flowers* numerous in rather dense panicles, 2·5 in. long, 2 in. wide; peduncles ·5 to 1·5 in. long; bracts small, caducous; pedicels ·1 to ·25 in. long, mostly short. *Sepals* ovate, obtuse, glabrous, ·2 in. long. *Corolla* white, slightly tinged with pink; tube narrowly funnel-shaped throughout, 1 to 1·25 in. long, hardly ·3 in. wide at the throat, limb rather narrow, abruptly explanate. *Capsule* ovoid, sub-acute, ·3 in. long, 4-seeded. *Seeds* with long silky hairs. *Convolvulus polyanthus*, Wall. Cat. 1378. *Lettsomia sumatrana*, Miq. Flor. Ind. Bat. Suppl. 560.

PENANG: *Porter* (*Wallieh* 1378)! PERAK: Larut, *Seorteehini!* *King's Collector* 1119! 2538! 5091!—DISTRIB. Sumatra.

numerous distant linear segments, glabrous; 3 to 5 in. long, 2 to 3 in. wide; petioles 1 to 3 in. long. *Flowers* in axillary lax few-flowered cymes; peduncles slender, 2 to 4 in. long; pedicels erect, if more than one virgate; bracts minute. *Sepals* 5, elliptic, .25 in. long, hardly changed in fruit. *Corolla* dark red, occasionally in cultivated varieties white; tube slender, 1 in. long; limb salver-shaped, somewhat oblique, .75 in. across. *Stamens* 5, exserted. *Capsule* smooth, ovoid, .3 in. long, completely 4-celled with membranous persistent septa. *Seeds* puberulous. Hallier f. Engl. Bot. Jahrb. XVIII. 154. *Q. vulgaris*, Choisy Convolv. Or. 52, and in DC. Prod. IX. 336. *Convolvulus pinnatus*, Desr. in Lamk Encyc. Meth. III. 567. *C. Quamoelit*, Spreng. Syst. I. 591; Wall. Cat. 1375. *Ipomœa Quamoelit*, Linn. Sp. Pl. 159; Bot. Mag. t. 244; Bl. Bijdr. 708; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 93, and Flor. Ind. I. 502; Clarke in Hook f. Flor. Brit. Ind. IV. 199.

PENANG: Batu Gaja jungles, *Deshamps*!—DISTRIB. Widely naturalised in S.E. Asia, native of America.

16. CALONYCTION, Choisy.

Large herbaceous climbers, stems usually muricate. *Leaves* large, cordate, entire or angled. *Flowers* solitary or in few-flowered axillary cymes; bracts caducous. *Sepals* 5, herbaceous, smooth, usually aristate, sub-equal or the outer smaller. *Corolla* large, salver-shaped, white or rose-purple; tube narrow-cylindric; limb plicate. *Stamens* 5, adnate to corolla-tube, considerably exserted. *Ovary* glabrous, 2-locular; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule. *Seeds* 4, dull, glabrous.—Species 6 to 7, all tropical American, 2 now widespread and sub-spontaneous in the tropics of the Eastern Hemisphere.

CALONYCTION BONA-NOX, Boj. Hort. Maurit. 227. A large climber, stems smooth or muricate, glabrous. *Leaves* ovate-cordate, acute, glabrous, entire or casually lobed; 3 to 8 in. long, 2 to 4 in. wide; petiole 3 to 6 in. long. *Flowers* on axillary 1-5-flowered peduncles, 2 to 6 in. long; bracts caducous. *Sepals* 5, usually ovate, obtuse with a mucro, very slightly enlarged in fruit, glabrous; .5 in. long. *Corolla* 3 in. long; tube linear, .2 in. wide; limb salver-shaped, 3 to 5 in. wide, white. *Stamens* 5, slightly unequal, distinctly exserted. *Capsule* ovoid-oblong, narrowed upwards, 1 in. long; peduncle in fruit slightly thickened. *Seeds* glabrous. Hallier f. Bull. Herb. Boiss. V. 1028. *C. noctilueum*, Don in Sw. Hort. Brit. ed. III. 482. *C. speciosum*, Choisy Mem. Soc. Gen. VI. 441, t. 1, f. 4, and in DC. Prod. IX. 345; Hallier f. Engl. Bot. Jahrb. XVI. 556; XVIII. 153. *C. Roxburghii*, G. Don Gen. Syst. IV. 263. *Convolvulus aculeatus*, Linn. Sp. Pl. ed. I. 155. *C. bona-nox*

Spreng. Syst. I. 600. *C. grandiflorus*, Linn. f. Suppl. 136; Willd. Sp. Pl. I. 2. 859; Pers. Synops. I. 179; Wall. Cat. 1370. *C. latiflorus*, Desr. in Lamk Encyc. Meth. III. 561. *Ipomœa bona-nox*, Linn. Sp. Pl. ed. II. 228; Roem. & Schult. Syst. IV. 217; Bl. Bijdr. II. 712; Kurz For. Fl. Burm. II. 217; Clarke in Hook. f. Flor. Brit. Ind. IV. 197. *I. grandiflora*, Lamk Ill. I. 467, and Encyc. Meth. III. 16; Roem. & Schult. Syst. IV. 240; Roxb. Hort. Beng. 14, Flor. Ind. ed. Carey & Wall. II. 87, and Flor. Ind. I. 497. *I. Roxburghii*, Steud. Nomencl. ed. II. 1, 819. *I. noctiflora*, Griff. Not. IV. 286.

PENANG: cultivated, Hallier. SINGAPORE: *S. Mayer* 211.—DISTRIB. Throughout the tropics; possibly not truly wild in our area.

17. ARGYREIA, Lour.

Climbing rarely sub-erect shrubs. *Leaves* cordate to lanceolate, pubescent or silky. *Flowers* axillary, usually in many-flowered cymes, often sub-capitate; bracts often conspicuous. *Sepals* 5, herbaceous in flower; in fruit leathery but little enlarged; often red within. *Corolla* funnel-shaped, rose-purple, tube more or less hirsute externally; limb plicate, shortly 5-lobed. *Stamens* 5, included; anthers oblong, straight. *Disk* annular. *Ovary* 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a hard dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 30, in the tropics of the Old World chiefly, and mostly in S.E. Asia and Polynesia.

ARGYREIA OBTUSIFOLIA, Lour. Flor. Cochinchin. 135. A large climber. *Leaves* elliptic or oblong, acute or obtuse, with or without a sub-mucronate tip, base cuneate or occasionally rounded, upper surface pilose, under surface silky strigose, nerves 9 to 11 pairs, often rather distinct beneath, very oblique even in wide-leaved plants; length 5 in., breadth 1·5 to 3 in.; petiole ·6 to ·8 in., very rarely 1 to 1·5 in. long. *Flowers* axillary; peduncles usually short, ·6 to 1 in., but occasionally 1·5 to 3 in. long; cymes sub-capitate, the pedicels ·1 to ·2 in. long; bracts ovate, ·15 to ·2 in. long, caducous. *Sepals* 5, ovate-obtuse, ·25 in. long, densely silky-strigose externally, sub-patent in fruit, pale red within. *Corolla* 1·5 in. long, tubular-campanulate, densely uniformly hirsute externally. *Capsule* ·4 in. in diam., globose, pericarp chartaceous, pink. *Seeds* finely grey-velvety, hemispheric, ·2 in. in diam. Choisy in DC. Prod. IX. 333. *Convolvulus obtectus*, Wall. Cat. 1416. *Rivea? obtecta*, Choisy, Convolv. Or. 28, and in DC. Prod. IX. 326. *Argyreia Championi*, Benth. Fl. Hongkong, 236. *A. obtecta*, Clarke in Hook. f. Flor. Brit. Ind. IV. 186. *Lettsonia Championi*, Benth. & Hook. f. Gen. Pl. II. 869.

PERAK: *Scortechini* 1384! KEDAH: Langkawi, *Curtis* 2852!—

DISTRIB. Indo-China, from the Andamans and Tenasserim to Cochin China, Hongkong.

The two varieties distinguished in the *Flora of British India* can no longer be maintained in view of the large suites of specimens reported of late years from the Andamans, where the species is exceedingly common.

18. LETTSOMIA, Roxb.

Scandent, more or less hirsute or strigose shrubs. *Leaves* cordate rounded or truncate. *Flowers* in axillary, peduncled, corymbose or capitate cymes; bracts conspicuous. *Sepals* 5, orbicular or elliptic; somewhat thickened and coriaceous in fruit. *Corolla* usually pink; tube infundibuliform-campanulate; limb plicate, very shortly 5-lobed. *Stamens* 5, exserted or included; anthers oblong or linear, straight. *Disk* annular or cupular. *Ovary* 2-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a dry berry. *Seeds* 4 or fewer, embedded in a mealy pulp.—DISTRIB. Species about 40, in tropical Africa and S.E. Asia.

There is not, as the writer has already explained (*Journ. As. Soc. Beng.* LXIII. 2, 91), any very good reason for retaining *Lettsomia* as a genus apart from *Argyreia*. In *Argyreia* the ovary is completely 4-celled; in *Lettsomia* it is 2-celled, but not infrequently a partial dissepiment of smaller or larger size is to be found at the base of, sometimes half-way up, the cell.

Capsule chartaceous; seeds usually 4, only casually fewer; leaves cordate, softly hairy; cymes capitate; bracts large, elliptic-oblong, sub-persistent

1. *L. peguensis*.

Capsule coriaceous or sometimes somewhat fleshy; seeds usually 1, only casually 2:—

Cymes compact; bracts large, persistent:—

Cymes capitate, globose; bracts purple, large, orbicular-obtuse; leaves ovate-lanceolate, sparingly adpressed-hirsute

2. *L. sphaerocephala*.

Cymes sub-capitate, hardly globose; bracts ovate or ovate-lanceolate, acute; leaves ovate or elliptic, base rounded or shortly cuneate:—

Corolla 2·25 in. long; leaves chartaceous, glabrous and shining above, a few hairs on petiole and midrib beneath

3. *L. Maingayi*.

Corolla 1·25 in. long; leaves firmer, glabrous not shining above, hirsute beneath:—

Leaves hirsute, more especially on the nerves, beneath; petioles sparingly hairy

4. *L. Ridleyi*.

Leaves densely hirsute beneath throughout; petioles densely hairy

4a. *L. Ridleyi*,
VAR. *velutina*.

Cymes lax; bracts small, rarely with a casual foliaceous bract in a cyme, and usually caducous:—

Sepals narrowly lanceolate, acute, spreading or sub-reflexed in fruit; bracts lanceolate, occasionally one large and leaf-like; leaves elliptic, softly hairy on both surfaces

5. *L. adpressa*.

Sepals ovate or orbicular, obtuse or rarely some of them emarginate; bracts minute, usually caducous; leaves glabrous above:—

Sepals irregular, the three outer entire rounded, sparingly hairy, the two inner wider deeply emarginate, all closely embracing the base of the fruit; leaves elliptic shortly acuminate, sparingly adpressed-pubescent beneath 6. *L. Curtisii*.

Sepals regular or nearly so, all entire:—

Corolla 1·5 to 1·75 in. long:—

Sepals sub-equal, at length almost glabrous and somewhat spreading in fruit; leaves elliptic-oblong, chartaceous, glabrous or very sparingly pubescent beneath 7. *L. penangiana*.

Sepals persistently adpressed grey-pubescent outside, the inner rather larger than the outer, closely embracing the base of the fruit; leaves ovate-acute, firm, sparsely hirsute with rusty hairs beneath .. 8. *L. Scortechinii*.

Corolla ·5 to ·75 in. long; leaves elliptic acuminate; sepals closely embracing the base of the fruit:—

Leaves densely tawny-tomentose beneath; sepals all softly tawny-velvety, the inner rather the smaller; corolla ·75 in. long 9. *L. rubicunda*.

Leaves sparingly strigose-hirsute beneath; sepals sub-equal, the outer pubescent, the inner at length almost glabrous 10. *L. Kunstleri*.

1. *LETTSOMIA PEGUENSIS*, Clarke in Hook. f. Flor. Brit. Ind. IV. 193.

A large climber, sometimes 50 feet long, with villous stems and branches. *Leaves* ovate, ovate-lanceolate or sub-orbicular, apex acute, base cordate; both surfaces densely softly hairy, tomentum fulvous but not acicular; length 4 to 6 in., width 1·5 to 3·5, rarely 5 to 6 in.; petiole 1·5 to 4 in. long. *Flowers* in axillary capitate cymes; peduncles 5 to 9 in. long; bracts sub-persistent, densely softly hairy, elliptic-oblong, 1 in. long. *Sepals* 5, the outer elliptic acute, rather larger than the inner lanceolate, densely hispid; ·5 to ·7 in. long. *Corolla* infundibuliform-campanulate, softly sparsely hairy externally, 2 in. long; limb and upper two-thirds of tube bright pink, base of tube nearly or quite white. *Berry* when ripe glossy brown, sub-globose, thin-walled, ·25 in. across. *Seeds* usually 2 or 4. Prain Journ. As. Soc. Beng. LXIII. 2, 94. *L. strigosa*, Roxb. Hort. Beng. 13, ex Wall. Cat. sub. n. 1404. *L. capitata*, Miq. Flor. Ind. Bat. II. 591. *Argyrea capitata*, Choisy in DC. Prod. IX. 332, partly and excluding var. β . *conferta*: Kurz For. Flor. Burm. II. 216 mainly. *Convolvulus strigosus*, Wall. Cat. 1365/2, 1365/c, and 1365/e partly. *C. barbigera*, Wall. Cat. 1404/1, 1404/2 in part. *Argyrea barbigera*, Choisy Convolv. Or. 42, and in DC. Prod. IX. 332.

PERAK: Batu Kuran, *Scortechini* 1628! near Goping, *King's Collector* 1077! Larut, *King's Collector* 2622! near Ulu Kerling, *King's Collector* 8627! PENANG: Bateh Pulo, *Deschamps*! SELANGOR: Woods at Gua Batu, *Ridley* 8210! 8227! 10194!—DISTRIB. Burma, Tenasserim, Sumatra, Java.

Probably only a geographical form of *Lettsomia strigosa*, Roxb., which is widespread in Indo-China and extends to S. China.

2. LETTSOMIA SPHÆROCEPHALA, Prain Journ. As. Soc. Beng. LXXIII. 2, 19. A shrubby climber; branches irregularly angled, with ridged bark brownish on young shoots, pale straw-coloured on older twigs, sparingly beset with adpressed acicular hairs. *Leaves* ovate-lanceolate, apex acute, base rounded, purplish beneath, very sparingly beset on both surfaces with adpressed hairs; length 4 to 5 in., width 1·5 to 2 in.; petiole 1 to 1·25 in., sparsely pubescent above with adpressed hairs. *Flowers* in compact capitate globose cymes 1·5 to 2 in. across, on long slender peduncles 2 to 12 in. long, sparingly adpressed-pubescent, surrounded by large orbicular purple involucrent sessile bracts 1·5 in. across, sparsely hirsute externally, quite glabrous internally, the individual flowers enveloped in similar but smaller sub-orbicular to spatulate bracteoles ·5 in. long, ·25 to ·5 in. wide; pedicels short adpressed-setose. *Sepals* glabrous externally except at their setose apices, the outer sub-acute, the inner wider obtuse ·25 in. long. *Corolla* ·75 to 1 in. long, infundibuliform-campanulate, pink, softly adpressed-hirsute externally. *Berry* not seen. *Argyria sphærocephala*, Prain MSS.

PERAK: Krian, Abu Salama, Gunong Haran Ryah, *Scortechini*!

A very striking and remarkable species. The corollas do not appear to be full-sized. *Scortechini*, on the ticket of his Gunong Haran Ryah specimens, has written "fruit from Maxwell's Hill," but unfortunately the fruiting specimens alluded to are not at Calcutta.

3. LETTSOMIA MAINGAYI, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. A large slender climber; branches slender or stoutish, with spreading setulose hairs. *Leaves* ovate or elliptic, base rounded or very shortly cuneate, apex acute or shortly caudate-acuminate, papery, glabrous and shining on both surfaces except for a few hairs on the midrib beneath; length 5 to 7 in., width 3 to 4 in.; lateral nerves 5 to 7; petioles ·5 to 1 in. long, very sparsely setulose. *Flowers* in axillary few-flowered cymes 2 to 3 in. wide; peduncles ·25 to 2 in. long, rather closely hirsute with tawny spreading hairs; bracts ovate-lanceolate, 1·5 in. long, ·6 in. wide, rather strongly parallel-nerved, sparingly hirsute externally, glabrous and dark purple within; bracteoles similar but smaller, ·3 in. long. *Sepals* linear-lanceolate, long-acuminate, ·75 in.

long, beset with long setulose hairs. *Corolla* tubular-campanulate, purple with whitish folds, 2·25 in. long; hairy externally. *Stamens* with filaments glandular-hairy at the thickened base. *Berry* ellipsoid, succulent, ·75 in. long, ·5 in. wide. *Seed* solitary.

MALACCA: *Griffith, Maingay, Derry* 318! *Goodenough* 1432! PERAK: *Scortechini* 297!

A very distinct species. There is no fruiting specimen in Herb. Calcutta; the above description of the berry is taken from the *Flora of British India*.

4. LETTSOMIA RIDLEYI, Prain Journ. As. Soc. Beng. LXIII. 2, 98. A large climber; branches sparingly hirsute. *Leaves* elliptic-acuminate, quite glabrous above, hirsute especially on the nerves beneath; 5·5 in. long, 3·5 in. wide; petiole 1 to 3 in. long, sparsely hirsute. *Flowers* in compact sub-capitate 8–10-flowered cymes 1·5 in. across, surrounded by large ovate-acute sessile foliaceous persistent bracts hirsute below, quite glabrous above, ·8 in. long, ·25 in. wide; bracteoles similar but smaller, ·3 in. long; peduncles 2 to 6 in. long, hirsute. *Sepals* sub-equal, ovate-lanceolate, externally pubescent, ·3 in. long. *Corolla* pink, infundibuliform-campanulate, 1·25 in. long, tube hirsute externally. *Berry* ovoid, ·5 in. long, ·3 in. in diam., the sepals spreading from its base.

JOHORE: Kota Tinggi, *Ridley* 4214! Chin-chin, *Lake & Kelsall*! SINGAPORE: Bukit Maudai, *Ridley*!

VAR. *velutina*, Prain l.c. *Leaves* beneath densely hirsute, as are the petioles, pedicels, and bracts externally.

SINGAPORE: Bukit Mandai, *Ridley*!

Nearst to *L. sphærocephala*, but distinguished by the acute bracts and bracteoles, and to *L. Maingayi*, from which it differs by the smaller flowers and shorter bracts and sepals. VAR. *velutina* in foliage and tomentum remarkably resembles *L. rubicunda*, but the acute sepals and large persistent bracts and bracteoles amply distinguish it.

5. LETTSOMIA ADPRESSA, Miq. Flor. Ind. Bat. II. 591. A scandent shrub; branches hirsute; stems 10 to 30 feet long. *Leaves* elliptic, softly hirsute on both surfaces; base rounded or cuneate, apex acute; length 4 to 5 in.; width 2 to 2·5 in.; petiole 1·5 in. long, softly hirsute. *Flowers* in axillary few-flowered, somewhat open cymes 2 in. across; peduncles ·5 to 1·5 in. long, hirsute; bracts lanceolate, hirsute, ·3 in. long, ·15 in. wide, with an occasional longer leaf-like bract; bracteoles small. *Sepals* ·3 to ·5 in. long, narrowly lanceolate, sparingly hirsute, spreading or sub-reflexed in fruit. *Corolla* tubular-campanulate, dull claret, or pale pink and white, or white with claret stripes, externally hairy; tube 1·25 in. long. *Berry* ellipsoid, ·5 in. long, ·3 in. wide, at first green with a reddish tint, becoming bright pink, and at length, when quite ripe, reddish-brown. Clarke in Hook. f. Flor. Brit. Ind. IV. 196.

Convolvulus adpressus, Wall. Cat. 1424. *Mooreoфия adpressa*, Choisy Convolv. Or. 49, and in DC. Prod. IX. 334.

PENANG: Porter! Kunstler 1324! 5271! Curtis 318! MALACCA: Maingay! PERAK: Seorteehini 1280! King's Collector 2457! 5400! Wray 1914! 3298! 3961!

6. LETTSOMIA CURTISII, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A climber with brown glabrous branches. *Leaves* elliptic, shortly acuminate, glabrous except for a few hairs on the midrib above, sparingly adpressed-hirsute beneath; length 4 to 5 in., width 2·5 to 3 in.; petiole 2 to 3 in. long, glabrous. *Flowers* in axillary compound sub-umbellate cymes, 3 in. wide, 12-16-flowered; peduncles 4 to 10 in. long, brown, glabrous; bracts deciduous. *Sepals* coriaceous, 2·5 in. long, the three outer sparingly hirsute, rounded, entire, the two inner wider, deeply emarginate, glabrous. *Corolla* not seen. *Berry* ovoid, succulent, 7·5 in. long, 5 in. wide, lower third closely embraced by the sepals.

SELANGOR: Kwala Lampar, Curtis 2158!

A very distinct species, easily differentiated by its emarginate inner sepals.

7. LETTSOMIA PENANGIANA, Miq. Flor. Ind. Bat. III. 592. A climber with very slender stems sometimes 100 feet long, young branches thin, fulvous-tomentose, soon becoming glabrous. *Leaves* elliptic-oblong, base rounded or cuneate, apex acute or sub-acute, papery, medium green glabrous above, very light green and glabrous or sparingly adpressed-pubescent and more closely hairy on the midrib beneath; 6 in. long, 2·5 in. wide; petiole 5 to 1 in., glabrous. *Flowers* in lax axillary cymes 2 to 3 in. across, the terminal flower usually longer than the others; peduncles slender, 2 to 6 in. long, very sparsely hirsute, soon glabrous; pedicels 3 to 7 in. long, slender, hirsute; bracts minute. *Sepals* ovate-obtuse, sparingly hairy and at length glabrescent, 2 in. long, at length spreading or sub-reflexed. *Corolla* tubular-campanulate, externally hirsute, bright claret or purple within, paler without, 1·5 to 1·75 in. long. *Berry* ovoid, 6 in. long, 3 in. wide, rose-pink, reddish-blue, or purple. Clarke in Hook. f. Flor. Brit. Ind. IV. 196; Prain Journ. As. Soc. Beng. LXIII. 2, 99. *Convolvulus penangianus*, Wall. Cat. 1425. *Mooreoфия penangiana*, Choisy Convolv. Or. 50, t. 4., and in DC. Prod. IX. 335.

PENANG: Porter! Curtis 1586! PERAK: very common; Seorte-chini 1147! Wray 2061! 2095! 2334! 2733! Curtis 2034! Derry! King's Collector 1936! 2048! 2574! 3223! 5339!

VAR. *reticulata*, Prain Journ. As. Soc. Beng. LXIII. 2, 100. Leaves thicker, secondary nerves beneath very distinct.

PERAK: Larut, *King's Collector* 8544!

The leaves of this species are very characteristically glandular-punctate beneath. The peduncles and pedicels of var. *reticulata* are rather shorter than in the type and the corolla, described by Kunstler as "waxy white, pale blue inside," is only two-thirds the length and only half the width of that of *L. penangiana* proper. But the leaves have the same characteristic glandular punctulation and are similarly sparingly adpressed-pubescent beneath, while the fruit, described by Kunstler as a rich pink, is indistinguishable from that of *L. penangiana*. This form, therefore, though very distinct, cannot yet be more than varietally separated.

8. LETTSOMIA SCORTECHINII, Prain Journ. As. Soc. Beng. LXIII. 2, 98. A strong climber; stems rusty-brown, very sparingly pubescent. *Leaves* ovate-acute, base rounded, firmly sub-coriaceous, very sparsely hirsute with scattered rusty hairs beneath, glabrous above; length 2 to 3 in., width 1 to 2 in.; petiole .5 to 1 in., minutely sparingly rusty-pubescent. *Flowers* in open 3-8-flowered corymbose cymes 1 to 1.5 in. across; peduncles minutely sparingly rusty-pubescent, 2 to 5 in. long; bracts caducous. *Sepals* orbicular, minutely adpressed-grey-tomentose externally, in flower .25 in., in fruit .3 in. across, the inner larger than the outer. *Corolla* 1.5 in. long, infundibuliform-campanulate, pink, densely adpressed-fulvous-tomentose on tube and bands of limb externally. *Berry* sub-spherical to ellipsoid, .5 in. wide, .5 to .75 in. long, the base closely embraced by the sepals.

PERAK: Canfield's Hill, 4,000 feet, *Scortechini* 381! Birch's Hill, *Ridley* 10681! Maxwell's Hill, *Ridley* 5559!

As in the case of *L. rubicunda*, one or two bracts remain on the specimens; they are small, orbicular, .2 in. across, but it does not follow that the fallen bracts were so small. The corollas on *Scortechini*'s specimens, on which the original description was based, are about .6 in. long, but subsequent material communicated by Mr. Ridley (*Ridley* 5559) shows that the flowers originally described were not fully expanded. Another of Mr. Ridley's specimens (10681) proves that the berry is not always sub-spherical. The species is obviously closely allied to *L. rubicunda*, but besides the very different degree of tomentum, *L. Scortechini* differs from *L. rubicunda* in having the inner sepals distinctly larger, instead of smaller, than the outer.

9. LETTSOMIA RUBICUNDA, Clarke in Hook. f. Flor. Brit. Ind. IV. 195. An extensive climber; stems fulvous-tomentose. *Leaves* elliptic, shortly abruptly acuminate or acute, base rounded, sub-coriaceous, densely tawny-tomentose beneath, glabrous above; length 5 to 7 in., width 2 to 4 in.; petiole tawny-tomentose, 1 to 2 in. long. *Flowers* in open many-flowered corymbose cymes, 2 to 4 in. across; peduncles tawny-tomentose, 3.5 to 7 in. long; bracts caducous. *Sepals* orbicular, obtuse, softly tawny-velvety, in flower .2 in., in fruit .3 in. across, the inner rather smaller. *Corolla* .75 in. long, infundibuliform-campanulate, pink, densely tawny-tomentose externally. *Berry* ellipsoid, obtuse,

smooth, dry, .75 in. long, .3 to .5 in. wide, the base closely embraced by the sepals. *Convolvulus rubicundus*, Wall. Cat. 1409. *Argyrea rubicunda*, Choisy Convolv. Or. 44, and in DC. Prod. IX. 333.

MALACCA: *Griffith!* Maingay.—DISTRIB. Burma.

The above description is taken from Griffith's Malacca plant; the writer has seen no other specimens. One or two bracts remain; they are small, .2 in. across, and orbicular, but it does not follow that the fallen bracts were so small. There is no perfect corolla on the specimens at Calcutta; the length of the tube given above is derived from Mr. C. B. Clarke's description.

10. LETTSOMIA KUNSTLERI, Prain Journ. As. Soc. Beng. LXIII. 2, 100. A slender climber, 50 to 80 feet long, young branches densely hirsute. *Leaves* elliptic-acuminate, glabrous and shining above, sparingly strigose-hirsute beneath, especially on the nerves, occasionally the midrib above sparsely hairy; length 3.5 to 4.5 in., width 2 to 2.5 in.; petioles densely hirsute, 1 to 1.5 in. long. *Flowers* in lax axillary 12-20-flowered cymes, 2 to 3 in. across; peduncles 5 to 8 in. long, densely hirsute; bracts hirsute, 3 in. wide; pedicels hirsute, slender, .5 to .75 in. long. *Sepals* orbicular, sub-equal, the three outer pubescent, the others at length almost glabrous, .15 in. long. *Corolla* white externally, bright pink or red within, externally hirsute, tubular-campanulate, .5 in. long. *Berry* ovoid, .5 in. long, .3 in. wide, deep glossy red.

PERAK: Larut; Kota, Wray 2856! Ulu Salama, Seortechini! Goping, Chandleriang, &c., King's Collector, 732! 2307! 2726! 5672! Campon Road, Ridley 9704! SELANGOR: Batu Caves, Ridley 8220!—DISTRIB. Sumatra.

Order LXXXII. SOLANACEÆ.

[By D. PRAIN.]

Herbs or shrubs, sometimes becoming small soft-wooded trees. *Leaves* alternate or at times in unequal pairs, rarely clustered, never truly opposite, entire, lobed or pinnate; stipules 0. *Inflorescence* of terminal or oftener lateral axillary or extra-axillary cymes, or of solitary or clustered pedicels, without bracts or bracteoles. *Flowers* regular, hermaphrodite. *Calyx* inferior, gamosepalous, lobes or teeth usually 5, rare 4 or 6 to 10; usually persistent, sometimes enlarged in fruit. *Corolla* gamosepalous 5-lobed or rarely (*Datura*) 10-lobed or with limb sub-entire; narrow-campanulate to rotate. *Stamens* 5, epipetalous; anthers oblong or narrow-ovate; cells parallel, dehiscing by apical pores or longitudinally. *Ovary* 2-celled or imperfectly

1-celled by abortion, or 4-celled by subsequent development of accessory dissepiments; style linear; stigma capitate or shortly lobed; ovules indefinite, on peltate intruded placentas. *Fruit* indehiscent, berry-like or capsular and opening by valvular or circumscissile dehiscence; usually 2-celled, rarely 4-celled, many-seeded. *Seeds* compressed, disc-like or sub-reniform with embryo peripheric; occasionally (*Nicotiana*) hardly compressed and with embryo straight.—DISTRIB. Species about 1,300, throughout tropical and sub-tropical countries.

Fruits berry-like, 2-celled, indehiscent; seeds compressed and embedded in pulp:—

Anthers opening by 2 small pores at the tips; fruits globular (in *S. Melongena* sometimes elongated) 1. SOLANUM.

Anthers dehiscing throughout longitudinally:—

Calyx in fruit small, fruits usually elongated 2. CAPSICUM.

Calyx in fruit enlarging and enveloping the globose berry 3. PHYSALIS.

Fruits capsular:—

Capsules 4-celled and 4-valved, or sometimes hardly dehiscing; seeds compressed; flowers solitary 4. DATURA.

Capsules 2-celled, dehiscing freely; seeds hardly compressed; flowers in panicles 5. NICOTIANA.

1. SOLANUM, Linn.

Armed or unarmed herbs, shrubs, or small trees. *Leaves* alternate or sub-opposed in unequal pairs, entire, lobed or pinnatifid. *Cymes* dichotomous or racemose, lateral or terminal. *Calyx* usually 5-lobed, rarely 10-lobed or sub-entire, sometimes enlarging in fruit. *Corollatube* short, rotate or very shortly campanulate; limb 5-lobed, plicate in bud. *Stamens* 5, with short filaments, adnate to throat of corolla; anthers oblong, narrowed upwards so that the two cells form a cone opening at the tip by terminal pores. *Ovary* 2-celled (in cultivated forms sometimes 3–4-celled); style columnar, stigma small. *Fruit* berry-like but with calyx at base, rarely overtopping it, globose or (rarely) elongated. *Seeds* very numerous, disk-like; embryo peripheric.—DISTRIB. Species 750, mostly tropical American, but spread throughout all tropical and sub-tropical regions.

Unarmed herbs or shrubs:—

Flowers in extra-axillary peduncled cymes or racemes:—

Leaves glabrous or sparingly pubescent; cymes sub-umbellate; calyx-teeth obtuse, 5; corolla and ovary glabrous; berry red or black, rarely yellow 1. *S. nigrum*.

Leaves densely stellately woolly; cymes corymbose; calyx-teeth triangular, 5; corolla and ovary hairy; berry yellow 2. *S. verbascifolium*.

Flowers axillary, pedicels fascicled or solitary; corolla glabrous:—

Calyx with a sub-entire margin; flowers white; leaves glabrous; epiphytic 3. *S. parasiticum*.

Calyx with a distinctly 10-toothed margin; terrestrial:—
Leaves glabrous; calyx with 5 long teeth and 5 very short intermediate toothlets; corolla-lobes purplish; berry dark blue 4. *S. Blumei*.

Leaves usually puberulous to pubescent, rarely almost glabrous; calyx with 10 long teeth; corolla white; berry yellow 5. *S. biflorum*.

Armed herbs with prickly stems and usually prickly leaves; corolla pubescent externally:—

Densely stellate-tomentose throughout:—

Calyx not overtopping the berry; erect herbs or shrubs:—

Flowers white:—

Leaves very prickly especially on the nerves beneath; ovary hirsute; fruit hispid with acicular hairs .. 6. *S. ferox*.

Leaves with very few prickles; ovary and fruit glabrous 7. *S. torvum*.

Flowers blue:—

Racemes many-flowered; berry small, yellow, globose 8. *S. indicum*.

Racemes few-flowered; berry large, purple, rarely white or yellow, often in cultivation ellipsoid or elongate .. 9. *S. Melongena*.

Calyx overtopping the berry; a spreading shrub .. 10. *S. sarmentosum*.

Thinly beset with minute hairs; berry large, smooth; calyx very prickly 11. *S. aculeatissimum*.

1. *SOLANUM NIGRUM*, Linn. Sp. Pl. 186. A herb or undershrub, 1 to 3 feet high; all parts sparingly pubescent or glabrous. *Leaves* petioled, membranous, ovate or oblong, narrowed towards apex and base, sinuate-toothed or -lobed; 3 to 4 in. long, 2 in. across; green on both surfaces; petioles .75 in. long. *Flowers* small, sub-umbellately clustered on stoutish extra-axillary peduncles .35 to .75 in. long; pedicels 5 to 8 together, slender, .35 in. long. *Calyx* sparsely puberulous, 5-toothed; teeth small, ovate-oblong, .05 in. long, in fruit hardly noticeable. *Corolla* white, rarely purplish, externally glabrous, .5 in. wide, rotate, 5-lobed. *Ovary* glabrous; style hairy at base. *Fruit* red or black, rarely yellow, globose, .25 in. across, supported by the saucer-shaped calyx. *Seeds* .05 in. in diam., almost smooth. Bl. Bijdr. 694; Dun. in DC. Prod. XIII. 150; Miq. Flor. Ind. Bat. II. 636; Kurz For. Flor. Burm. II. 224; Clarke in Hook. f. Fl. Br. Ind. IV. 229. *S. rubrum*, Roxb. Flor. Ind. I. 565. *S. triangulare*, Lamk Ill. II. 18. *S. uliginosum*, Bl. Bijdr. 695. *S. Rumphii*, Dun. in DC. Prod. XIII. 57. *S. rhinocerotis*, Bl. Bijdr. 695.

SINGAPORE: Ridley 8084! PERAK: Kota Bahru, King's Collector 566! ANDAMANS: King's Collectors! NICOBARS: Kurz!—DISTRIB. Tropics generally.

2. *SOLANUM VERBASCIFOLIUM*, Linn. Sp. Pl. 184. An erect unarmed shrub, 8 to 20 feet high; all parts thickly stellate-tomentose, the

tomentum often scurfy. *Leaves* petioled, thickly herbaceous, ovate-lanceolate to lanceolate, acute; base usually truncate or rounded, rarely cuneate; 4 to 7 in. long, 3 in. across; green above, white to yellowish-brown beneath from the scurfy tomentum; petioles .5 to 1.5 in. long. *Flowers* small, on thick tomentose pedicels, densely clustered in a small tomentose corymb-like cyme on an erect sub-terminal stout peduncle 1 to 3 in. long. *Calyx* densely tomentose, 5-toothed; teeth triangular, acute, .1 in. long in flower. .3 in. long in fruit; tube short. *Corolla* white, externally stellate-tomentose, .6 in. across, rotate, 5-lobed; lobes short, ovate-oblong. *Ovary* hairy; style glabrous. *Fruit* yellow, globose, .4 in. wide, the lower portion embraced by the calyx-lobes. *Seeds* .12 in. in diam., minutely dotted. Dun. in DC. Prod. XIII. 114; Lour. Flor. Cochinchina. 128; Wall. Cat. 2616; Kurz For. Flor. II. 225; Clarke in Hook. f. Flor. Brit. Ind. IV. 230; Miq. Flor. Ind. Bat. II. 640. *S. pubescens*, Bl. Bijdr. 698; Roxb. Flor. Ind. ed. Carey & Wall. II. 244 (not of Willd.).

SELANGOR: Kwala Lampar, *Goodenough*! PERAK: *King's Collector* 2069! 7177! Wray 2357! PENANG: *Deschamps*! KEDAH: *King's Collector* 1704! NICOBARS: Kamorta, *Jelinek*! Teressa, *King's Collectors*!—DISTRIB. Tropics of both hemispheres.

3. *SOLANUM PARASITICUM*, Bl. Bijdr. 697. An erect almost glabrous epiphytic shrub, 2 to 4 feet high. *Leaves* short-petioled, rather firmly membranous, lanceolate-acuminate, narrowed towards apex and base, entire; 6 to 8 in. long, 1.5 to 2 in. wide; green on both surfaces, minutely setulose above when young, glabrous beneath; petiole .25 to .35 in. long. *Flowers* small, clustered in an axillary fascicle of 2 to 7 together or sometimes solitary, on slender somewhat rigid glabrous pedicels .6 to .8 in. long. *Calyx* glabrous, small, the margin in flower sinuate representing either 5 or 10 teeth at most only .1 in. long; in fruit slightly enlarged, saucer-shaped, the margin quite entire. *Corolla* white, glabrous externally, 5-lobed, rotate; .25 in. across. *Ovary* and style glabrous. *Fruit* yellow, globose, .25 in. in diam., resting on the saucer-shaped calyx. *Seeds* .06 in. in diam., smooth. Nees Trans. Linn. Soc. XVII. 45; Miq. Flor. Ind. Bat. II. 641.

PERAK: Larut, on trees, rather plentiful, Wray! *Seortechini*! *King's Collector*!—DISTRIB. Sumatra, Java.

Near *S. subtruncatum* but always epiphytic, and with an even more markedly truncate calyx-limb than in that species.

4. *SOLANUM BLUMEI* Nees ex Bl. in Bijdr. 696. An erect quite glabrous shrub, 3 to 4 feet high, with spreading branches. *Leaves* towards top in pairs from one node, usually one smaller, elliptic-acuminate at both ends, bases unequal; 4 to 6 in. long, 2 to 3 in. wide;

rather firmly membranous; lateral nerves 6 to 7 pairs; petiole .3 in. long. *Flowers* in clusters of 2 to 9, rarely solitary, axillary; pedicels slender, in flower deflexed, in fruit spreading, .75 in. long, thickened upwards. *Calyx* glabrous, limb sub-truncate with 5 subulate, and 5 intervening minute teeth, the longer series .2 to .25 in. long. *Corolla* with white tube and 5 purplish narrow-ovate lobes, .3 in. across. *Ovary* and style glabrous. *Fruit* globose, dark blue, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .09 in. in diam., almost smooth. Nees Trans. Linn. Soc. XVII. 45; Dun. in DC. Prod. XIII. 180; Miq. Flor. Ind. Bat. II. 642.

SELANGOR: *Ridley*! PERAK: Larut, *King's Collector*! Wray! Curtis! *Ridley*! *Scortechini*! Gunong Panti, *Kunstler*!—DISTRIB. Sumatra, Java, Borneo.

The commonest *Solanum* of its group in our area. It has been suggested by Clarke that there is little to separate this form specifically from *S. subtruncatum*; this is true, but there seems equally little to separate it specifically from *S. biflorum*. Its glabrous condition, however, at once distinguishes it from both as, if not a species, at least a very marked form.

5. *SOLANUM BIFLORUM*, Lour. Flor. Cochinchin. 129. An erect more or less pubescent shrub, 3 to 6 feet high; the young shoots often flocculose. *Leaves* membranous, elliptic or oblong, acuminate, base narrow-cuneate, entire; 3 to 5 in. long, 1.5 to 1.75 in. wide; green on both sides, setulose-pubescent, rarely glabrescent with age; petiole .7 in. long. *Flowers* small, clustered in axillary fascicles of 2 to 6 together, or solitary; pedicels slender, .65 in. long. *Calyx* setulose-pubescent, the margin usually 10-toothed rarely 7-9-toothed; teeth narrowly lanceolate, setulose, .15 in. long. *Corolla* white, externally glabrous, rotate, 5-lobed, .25 in. across. *Ovary* and style glabrous. *Fruit* globose, yellow, .25 in. in diam., resting on the saucer-shaped calyx with persisting teeth. *Seeds* .1 in. in diam., almost smooth. Dun. in DC. Prod. XIII. 178; Kurz For. Flor. Burm. II. 224; Clarke in Hook. f. Flor. Brit. Ind. IV. 232. *S. decemdentatum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 565; Wall. Cat. 2614; Miq. Flor. Ind. Bat. II. 643. *S. mollissimum*, Bl. Bijdr. 698. *S. decemfidum*, Nees Trans. Linn. Soc. XVII. 43. *S. Zollingeri*, Dun. in DC. Prod. XIII. 176.

MALACCA: *Griffith*! SINGAPORE: *Wallich* (*vide* Clarke).—DISTRIB. Throughout Indo-China and the Malay Archipelago.

Though so plentiful in the countries both south and north of the Malay Peninsula, this seems very rare in our area where *S. Blumei* appears to replace it.

6. *SOLANUM FEROX*, Linn. Sp. Pl. ed. II. 267. An erect prickly shrub, 3 to 10 feet high, with a short soft-wooded trunk 2 to 3 in. thick;

all the younger parts thickly covered with a brownish soft tomentum intermixed with many sharp compressed brownish prickles of unequal size. *Leaves* usually sub-opposite, membranous, ovate to nearly orbicular with irregular short triangular acute or blunt lobes; 5 to 9 in. long, 3 to 6 in. wide, the lobes often 1 in. deep; green above, brownish from the tawny tomentum beneath, sparingly beset on midrib and nerves with long compressed prickles; petioles .5 to 2.5 in. long, prickly. *Flowers* large, on thickish pedicels clustered in few-flowered sub-umbellate short-peduncled racemes set close below the leaves; peduncles and pedicels densely stellate-tomentose and beset with long acicular hairs. *Calyx* shortly funnel-shaped, densely hirsute, sometimes prickly; lobes ovate-acute, .25 in. long. *Corolla* white, densely tomentose externally, nearly 1 in. across; lobes oblong-acute. *Ovary* hairy. *Fruit* yellow, globose, 1 in. in diam., hispid with acicular hairs, much exceeding the hardly altered calyx. *Seeds* .12 in. in diam., very slightly scrobiculate. Dun. in DC. Prod. XIII. 255; Kurz For. Fl. Burm. II. 226 (*excl.* var. β); Miq. Flor. Ind. Bat. II. 646; Clarke in Hook. f. Flor. Brit. Ind. IV. 233. *S. lasiocarpum*, Bl. Bijdr. 701; Wall. Cat. 2623; Dun. in DC. Prod. XIII. 252. *S. hirsutum*, Roxb. Hort. Beng. 17, and Fl. Ind. ed. Carey & Wall. II. 253. *S. stramonifolium*, Dun. in DC. Prod. XIII. 252 (*not of Jacq., nor of Wall., nor of Roxb.*).

PENANG: *Wallieh*! PERAK: Sungah Ryah, *Kunstler* 1022! Gunong Mesah, *King's Collector* 1026! SINGAPORE: *Wallieh*! ANDAMANS: Port Blair, plentiful. NICOBARS: Nancowry, *King's Collector*!—DISTRIB. India, Indo-China, S. China, Sumatra, Java.

7. *SOLANUM TORVUM*, Sw. Prod. Veg. Ind. Occ. 47. An erect sparingly armed shrubby perennial, 3 to 6, or at times even 8 to 12 feet high; all parts shortly and sparsely stellate-pubescent, with but few compressed sharp scattered prickles. *Leaves* usually sub-opposite, membranous, ovate, shortly acuminate, sinuate or lobed, the lobes obtuse or acute, the base truncate very unequal; 2 to 4 in. long, 1.5 to 3 in. across; rather sparingly pubescent above, more closely sometimes scurfily pubescent beneath; petioles .5 to 1 in. long. *Flowers* medium, in lateral usually extra-axillary corymbose cymes with short pubescent peduncles; pedicels slender, .3 to .4 in. long, pubescent. *Calyx* sparsely pubescent, 5-toothed, .25 in. long, without prickles, the teeth ovate-lanceolate acute, .1 in. long, not enlarging in fruit. *Corolla* white, externally stellate-pubescent, .5 in. across, rotate, 5-lobed, the lobes .3 in. long, lanceolate-acuminate. *Ovary* glabrous. *Fruit* yellow, supported by the calyx which becomes glabrous in fruit, globular, .4 in. across. *Seeds* .2 in. in diam., compressed, minutely granular. Dun. in DC. Prod. XIII. 260; Wight Ic. t. 345; Miq. Flor. Ind. Bat. II.

648; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. stramonifolium*, Roxb. Flor. Ind. I. 572.

PENANG: Wallich! Deschamps! Ridley! MALACCA: Griffith! PERAK: King's Collector 1085! Seortcehini 60! SINGAPORE: Schomburgk! Hullett! Kunstler 99! Ridley! ANDAMANS: very common.—DISTRIB. Malayan Archipelago, Indo-China, Philippines, China, India, Tropical America.

This is often exceedingly like the next species, *S. indicum*, but is easily distinguished by its white flowers and its considerably larger fruits.

8. *SOLANUM INDICUM*, Linn. Sp. Pl. 187 partly; Nees in Trans. Linn. Soc. XVII. 55. An erect, armed, branching shrub, 4 to 8 feet high; all young parts thickly covered with a short stellate tomentum, with broad, compressed, sharp, slightly recurved prickles. *Leaves* membranous or thinly herbaceous, ovate, sinuately lobed, the lobes obtuse or acute, the base obliquely truncate; 1·5 to 3 in. long, 1 to 2 in. wide; above minutely tomentose, green; grey from the denser tomentum beneath; petioles ·5 to 1 in. long. *Flowers* medium, in lateral or spuriously terminal racemes about 2·5 to 3 in. long; pedicels ·2 to ·3 in. long, sometimes prickly and grey stellate-pubescent, as are the peduncles. *Calyx* grey stellate-pubescent, 5-toothed, ·25 in. long, prickly or not; the teeth lanceolate-acute, hardly enlarging in fruit. *Corolla* blue, externally stellate-pubescent, ·5 in across, rotate, 5-lobed, the lobes ·35 in. long. *Ovary* glabrous. *Fruit* yellow or orange, small, supported by the hardly altered calyx, globose, ·25 in. in diam. *Seeds* ·15 in. in diam., minutely dotted. Lour. Flor. Cochin-Chin. 131; Roxb. Flor. Ind. I. 570; Wall. Cat. 2626; Wight, Ic. t. 346; Dun. in DC. Prod. XIII. 309; Miq. Flor. Ind. Bat. II. 651; Kurz For. Fl. Burm. II. 226; Clarke in Hook. f. Flor. Brit. Ind. IV. 234. *S. violaceum*, Jacq. Fragm. 82, t. 133, f. 1 (not of R. Br.). *S. cuneatum*, Moench Meth. n. 476; Poir. Suppl. III. 743. *S. canescens*, Bl. Bijdr. 701. *S. Junghuhnii*, Miq. Flor. Ind. Bat. II. 649.

PENANG: Wallich! SELANGOR: King's Collector 363! PERAK: Wray 3077! ANDAMANS: Prain!—DISTRIB. Throughout S.E. Asia.

This species often is very like *S. torvum*; it is readily distinguished by its usually, though not invariably, more numerous prickles, by its blue flowers, and its smaller fruits.

9. *SOLANUM MELONGENA*, Linn. Sp. Pl. 186. A stout erect, sparingly armed herb, 2 to 8 feet high; all the younger parts covered with a grey soft tomentum. *Leaves* membranous, ovate or oblong, irregularly sinuately lobed; 3 to 6 in. long, 2 to 4 in. wide; green above, stellately pubescent beneath with a few prickles on the nerves or sometimes

quite unarmed; petiole 1 in. long. *Flowers* large, on extra-axillary often paired peduncles, one peduncle with a solitary perfect flower the other with a few-flowered raceme of male flowers; peduncles stellate-tomentose, very rarely prickly. *Calyx* shortly funnel-shaped, densely pubescent; lobes oblong-acute; .25 to .35 in. long, enlarging slightly in fruit, usually armed. *Corolla* blue, externally pubescent, 1 to 1.25 in. across, 5-lobed, lobes oblong-acute, short. *Ovary* glabrous; style stellate-pubescent or at times glabrous. *Fruit* large, ovoid, obovoid, ellipsoid, or cylindric; usually dark purple, often with white spots or streaks, sometimes uniformly white or yellowish, always glabrous, sometimes as much as 6 in. long and always much longer than the calyx. *Seeds* .12 in. in diam., slightly scrobiculate. Lour. Flor. Cochinchin. 130; Roxb. Flor. Ind. I. 566; Miq. Flor. Ind. Bat. II. 653; Clarke in Hook. f. Flor. Brit. Ind. IV. 235. *S. insanum*, Roxb. Flor. Ind. I. 568. *S. undatum*, Lamk Encyc. IV. 301; Bl. Bijdr. 700. *S. longum*, Roxb. Hort. Beng. 16, and Flor. Ind. I. 567. *S. pseudo-undatum*, Bl. Bijdr. 699. *S. ovigerum*, Bl. Bijdr. 698. *S. Trongum*, Lamk Encyc. IV. 308. *S. ferox* var. *Trongum*, Kurz For. Flor. Burm. II. 226.

In all the provinces, cultivated; occasionally also as an escape from cultivation or sub-feral (e.g., at Trang, King's Collector 1416!)

The Egg-Plant, or Brinjal, largely cultivated in all warm countries; originally American. As an escape this species tends to become more prickly and to have 3 to 4 fruits on the peduncle, owing to the males being replaced by perfect flowers. In such cases the fruits are much smaller and often approach, or sometimes even attain a globose form.

10. *SOLANUM SARMENTOSUM*, Nees Trans. Linn. Soc. XVII. 58. A straggling prickly shrub with procumbent zigzag branches, 2 to 3 feet long; all parts sparsely hairy and covered with long, straight, sharp prickles. *Leaves* membranous, broadly elliptic, sub-pinnatifid, lobes obtuse, sub-glabrescent above, sparsely stellately pubescent and prickly beneath; 4 in. long, 2 in. across, the lobes .75 in. deep; green on both surfaces; petioles .6 in. long. *Flowers* large, with thickish pedicels on 1-2-flowered, extra-axillary peduncles about 1 in. long, sparsely stellate-pubescent. *Calyx* with very shortly funnel-shaped tube, lobes ovate-acuminate .2 in. long, sparsely hairy and prickly, much enlarged in fruit. *Corolla* blue, externally pubescent, .7 in. across; lobes oblong-acute. *Ovary* glabrous. *Fruit* yellow, globose, glabrous, .5 in. across, overtopped by the enlarged caudate-acuminate, adpressed, armed calyx-lobes, .75 in. long and .35 in. wide. *Seeds* .12 in. in diam., scrobiculate. Dun. in DC. Prod. XIII. 357; Clarke in Hook. f. Flor. Brit. Ind. IV. 236. *S. Melongena*, Wall. Cat. 2628 (F. only—not of Linn.). *S. Jacquini*, Miq. Flor. Ind. Bat. II. 651 (not of Willd.).

PENANG: *Wallieh*! PERAK: *Seortechini*! MALACCA: *Griffith*.
PAHANG: *Ridley*!—DISTRIB. Malay Archipelago.

11. *SOLANUM ACULEATISSIMUM*, Jacq. Col. I. 100. An armed slender undershrub, 2 to 3 feet high, with glabrous stems covered with very many long, straight, slender prickles. *Leaves* only on the upper part of the stems, membranous, ovate, lobed, sparsely hairy; 3 to 5 in. long. *Flowers* on 1-7-flowered peduncles, that are usually only 1-fruited; peduncles in fruit .75 in. long. *Calyx* even in fruit small, under .25 in. long, very prickly. *Fruit* globose, 1.25 in. across, smooth. *Seeds* .2 in. in diam., extremely compressed, almost winged. Jacq. Icon. I. t. 41; Clarke in Hook. f. Flor. Brit. Ind. IV. 237. *S. aculeatissimum* var.? *denudatum*, Dun. in DC. Prod. XIII. 244.

SINGAPORE: *G. Thomson*.

This is not in Herb. Calcutta. The above meagre description is taken from the accounts of Dunal in the *Prodromus*, and of Clarke in the *Flora of British India*. The specimen to which Clarke refers is one of the "varieties" of Dunal, not the true *S. aculeatissimum* of Jacquin, and Dunal himself was not satisfied that it is to Jacquin's species of this name that the variety should be referred. As it has not again been reported, it is possible we may have here to deal with an unusual state of some casually introduced and perhaps well-known American species.

2. *CAPSICUM*, Linn.

Unarmed annual or perennial, glabrous or glabrescent herbs or shrubs. *Leaves* alternate, entire or repand. *Flowers* axillary, solitary or several together. *Calyx* campanulate, minutely 5-toothed, not enlarging in fruit. *Corolla-tube* short, rotate, limb 5-lobed, valvate in bud. *Stamens* 5, adnate near base of corolla; anthers oblong, not longer than filaments, dehiscing longitudinally. *Ovary* 2-celled, rarely 3-celled; style columnar, stigma small. *Fruit* resembling a berry, but with the calyx at its base; elongated or (rarely) globose. *Seeds* very numerous, disk-like; embryo peripheric.—DISTRIB. Species 2 or more, natives of America.

The number of species is doubtful, and depends on the point of view of the reviewer with regard to the many more or less distinct forms assumed by the plants under cultivation; some writers recognise as many as 80, others claim only about 20; more recent authors insist only on 2 species—a perennial (*C. frutescens*), and an annual (*C. annuum*), both very variable. Possibly, however, there is but a single very variable species, for in the tropics the forms of *C. annuum* are often not truly annual, and in temperate regions the perennial tropical forms rarely persist for more than a season.

Pedicels solitary, variously erect or reflexed; fruits erect or spreading or pendent, at least as long as, usually longer than, the pedicels; plants annual or biennial:—

Flowers white; berries at first green, afterwards becoming red, orange or yellow:—

Fruit not globular:—

Berries tapering, much longer than broad :—

Fruit stout, flesh thick, usually mildly pungent; calyx not enclosing base of berry	..	..	..	1. <i>C. annuum</i> .
Fruit slender, flesh thin, keenly pungent; calyx enclosing base of berry	..	..	..	{ <i>annuum</i> , VAR. <i>acuminata</i> .

Berries not much if at all longer than broad, usually obtuse;

calyx not enclosing base of berry :—

Berries circular in section, sub-conical, ovate or oblong, flesh thin, pungent	..	..	..	{ <i>annuum</i> , VAR. <i>abbreviata</i> .
Berries swollen, irregularly angled in section, prismatic, quadrate or oblate, flesh very thick, hardly at all pungent	..	..	..	{ <i>annuum</i> , VAR. <i>grossa</i> .
Fruit globular, extremely pungent	..	..	..	{ <i>annuum</i> , VAR. <i>cerasiformis</i> .

Flowers purple; berries at first dark-purple, afterwards becoming orange-red, much longer than broad, only slightly pungent; calyx hardly enclosing base of berry	{ <i>annuum</i> , VAR. <i>nigra</i> .
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Pedicels 2 or more, erect; fruit always erect, red, shorter than the pedicels, pungent; plants perennial; flowers always white or yellowish-white :—

Berries elongated, tapering; base embraced by the calyx	2. <i>C. frutescens</i> .
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Berries globose or sub-globose; base seated on the calyx	..	{ <i>frutescens</i> , VAR. <i>baccata</i> .
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1. *CAPSICUM ANNUUM*, Linn. Sp. Pl. 188. An erect branching or rarely simple robust herb 2 to 3 feet high, with slightly ridged branches; glabrous throughout. *Leaves* membranous, elliptic or ovate, rather long-acuminate, base long-cuneate, prolonged as a wing on upper part of petiole, margin entire; lamina 3 in. long, .75 to 1 in. wide, rarely 1.5 in. wide, green on both surfaces; petiole .25 to .6 in. long. *Flowers* white or rarely (VAR. *nigra*) purple; pedicels almost always solitary, though casually there may be more than one in a leaf-axil, always drooping in flower, in fruit rigid, slightly thickened under the enlarging calyx and variously erect, or spreading or recurved and pendent, then .75 to 1 in. long. *Calyx* glabrous, campanulate, with sinuate-dentate limb, .2 in. across; in fruit enlarging into a shallow cup embracing the lower part of fruit, or saucer-shaped with the base of the fruit resting on it, then often .5 in. across. *Corolla* rotate, .4 in. across; 5-lobed. *Ovary* glabrous. *Fruit* erect, straight, very variable in shape, colour, fleshiness and pungency. Irish Miss. Bot. Gard. Rep. IX. 65.

VAR. *typica*. Fruit much longer than broad, stout, tapering to the usually narrow apex; flesh thick, mildly pungent; berry resting on the saucer-shaped fruiting calyx; colour variable.

In gardens, occasionally, usually raised from seed imported from Europe.

This variety includes the many mild chillies which do not keep true to their characters when their seed is collected in the tropics.

VAR. *acuminata*, Fingerhuth. Fruit much longer than broad, slender, rarely straight, always tapering to an acute or sub-acute apex; flesh thin, keenly pungent; berry enclosed at the base by the cupular calyx; colour red or orange, or yellow. *C. longum*, DC. Hort. Monsp. 86; Fingerhuth, Caps. 23, t. 6, 7; Dun. in DC. Prod. XIII. 424. *C. frutescens*, Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Bl. Bijdr. 704; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Cultivated in most of the provinces.

Some of the forms of this variety seem to have been evolved since the introduction of *Capsicum annum* to the Eastern Hemisphere.

VAR. *abbreviata*, Fingerhuth. Fruit conoid, ovate or oblong, not much longer than broad, apex usually blunt; flesh thin, pungent; berry resting on the saucer-shaped fruiting calyx; colour variable. *C. annum*, Roxb. Flor. Ind. I. 573. *C. frutescens*, Dun. in DC. Prod. I. 413. *Capo Molago*, Rheede Hort. Malab. II. 109, t. 56.

Occasionally cultivated.

VAR. *grossa*, Sendt. Fruit swollen, somewhat angular, prismatic or quadrate or oblate, obtuse, hardly longer than broad; flesh thick, hardly pungent; berry resting on the saucer-shaped fruiting calyx; colour red. *C. grossum*, Linn. Mant. 47; Willd. Sp. Pl. I. 1051; Roxb. Hort. Beng. 17; Flor. Ind. I. 574; Fingerhuth, Caps. 21; Dun. in DC. Prod. XIII. 422; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Occasionally cultivated.

VAR. *cerasiformis*, Mill. Fruit globular, red, flesh thin, very pungent. *C. cerasiforme*, Roxb. Flor. Ind. I. 574. *C. grossum*, VAR. *cerasiformis*, Clarke in Hook. f. Flor. Brit. Ind. IV. 239.

Sometimes grown in gardens by European residents.

VAR. *nigra*. Fruit much longer than broad; flesh thin, only slightly pungent; calyx hardly enclosing base of fruit; berry at first dark purple, at length becoming orange-red. *C. purpureum*, Roxb. Flor. Ind. IV. 239.

Occasionally cultivated.

2. *CAPSICUM FRUTESCENS*, Linn. Sp. Pl. 189. An erect, much-branching undershrub, 2 to 4 feet high, branches angled, the smaller ones puberulous but soon, like the leaves, becoming quite glabrous. *Leaves* petioled, membranous, ovate-acute, the base short-cuneate, truncate or rarely sub-cordate, the margins entire; lamina usually 2·5 to 4 in. long, 1·5 in. wide, green on both surfaces; petiole ·5 to ·75 in. long. *Flowers* small, white or yellowish-white; pedicels usually 2 to 3, sometimes 4 or more together in leaf-axils, never all of the same age, drooping in

flower and erect, thickened, rigid and somewhat elongated in fruit, 1 to 1·25 in. long. *Calyx* glabrous; limb truncate with 5 shortly projecting, spreading teeth ·12 in. in diam. *Corolla* ·2 in. in diam., rotate, 5-toothed. *Ovary* glabrous. *Fruit* erect, narrow to globose, bright red, ·2 to ·25 in. in diam. Irish Miss. Bot. Gard. Rep. IX. 97.

VAR. *typica*. Fruits ovate or sub-cylindric, acute, ·75 in. long, ·2 in. in diam. *C. frutescens*, Wall. Cat. 2642 B.C. *C. minimum*, Roxb. Hort. Beng. 17, Flor. Ind. ed. Carey & Wall. II. 261, and ed. propr. I. 574; Wall. Cat. 2641; Blanco, Flor. Filip. 133; Dun. in DC. Prod. XIII. 415; Miq. Flor. Ind. Bat. II. 659; Clarke in Hook. f. Flor. Brit. Ind. IV. 239. *C. fastigiatum*, Bl. Bijdr. 705; Nees Trans. Linn. Soc. XVII. 64; Dun. in DC. Prod. XIII. 416; Wight Ic. t. 1617; Miq. Flor. Ind. Bat. II. 659; Benth. & Trim. Med. Pl. t. 188.

In all the provinces, cultivated and as an escape.

VAR. *baccata*, Irish l.c. 99. Fruit elliptic-obtuse or globose, ·25 to ·3 in. long, ·25 in. in diam. *Capsicum baccatum*, Linn. Ment. 46; Ham. in Wall. Cat. 2644. *C. angustifolium*, Dun. in DC. Prod. XIII. 420.

NICOBARS: cultivated, *Jelinek* 137! 138!

3. *PHYSALIS*, Linn.

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Pedicels* axillary, solitary. *Calyx* campanulate, 5-partite in flower, the tube much enlarged and inflated in fruit, loosely enclosing the berry; teeth small, connivent. *Corolla* campanulate, yellow. *Stamens* 5, attached near base of corolla; anthers oblong, shorter than filaments, dehiscing longitudinally. *Ovary* 2-celled; style columnar; stigma obscurely 2-lobed. *Fruit* berry-like, globose. *Seeds* few or many, disk-like; embryo peripheric.—DISTRIB. Species about 34, mostly tropical American.

PHYSALIS MINIMA, Linn. A herbaceous pubescent or glabrescent annual, erect or with procumbent straggling branches, 6 to 15 in. high. *Leaves* petioled, ovate, sinuate angular or hardly lobed; 2 in. long, ·75 in. wide, green on both surfaces; petioles 1 in. *Flowers* small, axillary, solitary; pedicels ·25 to ·5 in. *Calyx* hirsute or glabrescent; in flower ·1 to ·2 in., with lanceolate lobes as long as tube, in fruit ·75 to 1 in., ovoid or sub-globose, 5-10-ribbed, the teeth subconnivent and little altered. *Corolla* yellow, ·25 in. across, glabrous, campanulate, 5-toothed. *Ovary* glabrous. *Fruits* yellow, globose, ·5 in. across, completely enveloped by the accrescent calyx. *Seeds* very many, ·1 in. in diam., discoid, reticulated, hardly scabrous.

VAR. *typica*; calyx not distinctly angled, all parts more or less pubescent. *P. minima*, Linn. Sp. Pl. 183; Nees in Trans. Linn. Soc.

XVII. 69; Roxb. Flor. Ind. I. 563; Dun. in DC. Prod. XIII. 445; Clarke in Hook. f. Flor. Brit. Ind. IV. 238; Miq. Flor. Ind. Bat. II. 664. *P. parviflora*, R. Br. Prod. 447. *P. divaricata*, Don Prod. 97. *P. villosa*, Roth Nov. Sp. 122. *P. Rothiana*, Roem. & Schult. Syst. IV. 677. *P. Hermannii*, Dun. in DC. Prod. XIII. 444.

PERAK: *Seortechini*! MALACCA: *Griffith*! ANDAMANS: common in waste places.—DISTRIB. A cosmopolitan tropical weed.

VAR. *indica*, Clarke Flor. Brit. Ind. IV. 238; calyx distinctly 5-angled, all parts nearly glabrous. *C. indica*, Lamk Encyc. Meth. II. 102; Nees in Trans. Linn. Soc. XVII. 70; Dun. in DC. Prod. XIII. 443; Miq. Flor. Ind. Bat. II. 662. *P. pseudoangulata*, Bl. Bijdr. 706; Miq. Flor. Ind. Bat. II. 663. *P. angulata*, Griff. Notul. IV. 96. *Nicandra indica*, Roem. & Schult. Syst. IV. 632.

PERAK: Kota Bahru, *Kunstler*, 568! Ipoh, *Curtis* 3190! PENANG: *Dcschamps*! common. SELANGOR: *Ridley* 10548! NICOBARS: coasts, common.—DISTRIB. India generally.

The Cape Gooseberry, or Winter Cherry (*Physalis peruviana*), is cultivated in European gardens in the cold weather.

4. DATURA, Linn.

Suffruticose, rank-smelling, glabrous or minutely pubescent herbs. *Leaves* large, entire, sinuate or deeply toothed. *Pedicels* solitary, flowers very large, purple or white. *Calyx* long-tubular, herbaceous, apex 5-toothed; in fruit circumscissile above the base. *Corolla* narrowly tubular-funnel-shaped; throat widened, limb plaited, entire or shortly lobed. *Stamens* attached near base of tube, filaments filiform; anthers included, linear, dehiscing longitudinally. *Ovary* 2-celled, or 4-celled by the formation of spurious dissepiments; style filiform; stigma 2-lobed. *Fruit* a capsule, ellipsoid, 4-celled, spinous, more or less completely 4-valved. *Seeds* very many, compressed, rugose; embryo peripheric.—DISTRIB. Species 10, temperate and tropical.

DATURA FASTUOSA, Linn. Syst. ed. X. 932. A coarse annual, 3 to 8 feet high, all parts glabrescent or very faintly puberulous. *Leaves* petioled, membranous, ovate, entire or deeply toothed, glabrous, green; 6 to 8 in. long, 3 to 4 in. across, base unequal; petioles 1 in. *Flowers* very large, solitary, pedicels .25 to .5 in., erect in flower, recurved in fruit. *Calyx* tubular, 2.5 to 3 in. long, .5 in. wide, lobes lanceolate, .25 in. long. *Corolla* purple or white, 7 in. long, base .5, throat 1.5, limb 3 to 5 in. in diam., shortly 5-6-toothed. *Ovary* glabrous. *Capsules* sub-globose, 4-celled, equally spinous on all sides, irregularly dehiscent

near apex, supported by the persistent base of calyx; 1·25 to 1·5 in. in diam. *Seeds* ·25 in. diam.

VAR. *typica*; corolla purple. *D. fastuosa*, Linn. Syst. ed. X. 932; Roxb. Flor. Ind. I. 561; Wall. Cat. 2638; Nees in Trans. Linn. Soc. XVII. 74; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 669; Clarke in Hook. f. Flor. Brit. Ind. IV. 242. *D. Hummatsu*, Bernh. in Linn. Litteraturber. (1883) 141.

VAR. *alba*, Clarke in Flor. Brit. Ind. IV. 243; corolla white or cream-coloured. *D. alba*, Nees in Trans. Linn. Soc. XVII. 73; Wight. Ic. t. 852; Dun. in DC. Prod. XIII. 542; Miq. Flor. Ind. Bat. II. 667. *D. Metel*, Roxb. Flor. Ind. I. 561; Wall. Cat. 2639 (*not of* Linn.).

PERAK: Larut, *Seortechini*! Ulu Bubong, *King's Collector*! SINGAPORE: *Hullett*!—DISTRIB. Tropical Africa, S.E. Asia.

The purple-flowered variety has not been sent to Calcutta from any of the provinces. Kunstler says that the white one is "not native" in Perak.

5. NICOTIANA, Linn.

Erect, viscid-pubescent herbs, shrubs, or trees. *Leaves* entire or sinuate. *Racemes* paniculate, terminal or sub-terminal. *Calyx* tubular or ovoid, 5-fid. *Corolla* funnel-shaped; lobes 5, induplicate in bud. *Stamens* attached to lower part of corolla-tube, filaments filiform; anthers ovate, dehiscing longitudinally. *Ovary* 2-celled; style filiform; stigma shortly 2-fid. *Fruit* a capsule, 2-celled, or rarely spuriously almost 4-celled; valves separating to their middle, often again splitting. *Seeds* very many, small, scarcely compressed; embryo nearly straight.—DISTRIB. Species about 35; American, Australian, Polynesian.

NICOTIANA TABACUM, Linn. Sp. Pl. 180. A herb 2 to 3 feet high branching upwards, all parts glandular-pubescent. *Leaves* large, sessile or sub-amplexicaul, ovate-lanceolate, acute, the lower decurrent; 4 to 8 in. (the lower sometimes 12 to 15 in. long) by 2 to 3 in. across; tapering to the cuneate base. *Flowers* large, in compound corymbs with short ultimate bracteate branchlets. *Calyx* campanulate, ·5 in. long, ·3 in. wide, teeth 5, triangular-lanceolate, ·2 in. long. *Corolla* pink or pale-rose, linear-funnel-shaped, 1·75 to 2 in. long, limb 1 in. across, lobes spreading ovate, sub-acuminate. *Capsule* ovate, ·75 in. long, ·5 in. in diam., slightly exceeding calyx. *Seeds* small. Gaertn. Fruct. I. 264, t. 55; Lamk Ill. t. 113; Dun. in DC. Prod. XIII. 557; Miq. Flor. Ind. Bat. II. 670; Clarke in Hook. f. Flor. Brit. Ind. IV. 245.

In all the provinces, cultivated.

A native of America, cultivated in all warm countries. The common Tobacco.

Order LXXXIII. SCROPHULARIACEÆ.

[By D. PRAIN.]

Herbs or shrubs, occasionally epiphytic, sometimes semi-parasitic. *Leaves* all or only the lower opposite, rarely all alternate or whorled, occasionally all radical, sub-rosulate; stipules 0. *Flowers* hermaphrodite, usually irregular; inflorescence centripetal or composite. *Calyx* inferior, 5-, rarely 4-lobed or -partite. *Corolla* hypogynous, more or less 2-lipped or occasionally personate; upper lip entire or 2-lobed, lower 3-lobed. *Stamens* epipetalous, usually 4, didynamous or rarely sub-equal, occasionally only 2, very rarely 5; anthers 2-celled, cells distinct or apically or entirely confluent, or 1-celled by abortion, often when stamens didynamous with anthers connivent and sometimes with their apices connate in a posterior and an anterior pair. *Disk* annular, cupular, or glandular. *Ovary* superior, 2-celled; ovules usually numerous in each cell, anatropous or amphitropous; style simple; stigma capitate or dilated, simple; occasionally 2-lobed or 2-lamellate. *Fruit* usually a capsule, rarely a berry; placentas sometimes persistent on a central axis, at others attached to margins of valves. *Seeds* small with a lateral or ventral hilum; albumen fleshy, rarely absent; embryo straight or curved.—DISTRIB. Species 2,000 or more, in all regions.

Angelonia grandiflora, C. Morr., an American species, has become naturalised as an escape from gardens in Selangor (*Goodenough* in Herb. Ridley 10486); it has long been similarly naturalised in Tenasserim and the Irawadi Delta, and has more recently become established in the Gangetic Delta.

Corolla with upper lip or two upper lobes outmost in bud :—

Stamens 4, fertile :—

All 4 filaments inserted within corolla-tube :—

Trees or epiphytes 1. WIGHTIA.

Herbs :—

Throat of corolla plicate, forming a 2-lobed palate; anther-cells contiguous, divaricate 2. MAZUS.

Throat of corolla not plicate :—

Anther-cells discrete, stipitate; corolla distinctly 2-lipped :—

Upper lobe of calyx distinctly exceeding the others; 2 or sometimes all the anthers with one cell imperfect 3. ADENOSMA.

Upper lobe of calyx hardly if at all exceeding the others; all 4 stamens with perfect anthers .. 4. LIMNOPHILA.

Anther-cells contiguous; lateral calyx-lobes much narrower than the other three; corolla sub-equally 5-lobed 5. HERPESTIS.

Only 2 posterior filaments inserted within corolla-tube; the anterior pair inserted on corolla-throat :—

Calyx with 3 to 5 distinct ridges or wings 6. TORENIA.

- Calyx without wings or ridges :—
 Calyx-segments narrow 7. VANDELLIA.
 Calyx-segments broad 8. ARTANEMA.
 Stamens only 2 posterior fertile, inserted within corolla-tube;
 anterior pair reduced to staminodes on corolla-throat :—
 Calyx 4-lobed, the outer lobes very broad 9. CURANGA.
 Calyx 5-lobed, the lobes all narrow 10. BONNAYA.
 Corolla with upper lip or 2 upper lobes inmost in bud; rarely
 lobes imbricate :—
 Corolla-tube very short; lobes 4, sub-equal, imbricate; stamens
 4, sub-equal 11. SCOPARIA.
 Corolla-tube elongated; lobes 5, 2-labiate :—
 Calyx tubular, 5-lobed 12. STRIOA.
 Calyx spathaceous, split in front 13. CENTRANTHERA.

1. WIGHTIA, Wall.

Large epiphytic climbers, eventually becoming trees. *Leaves* mostly or all opposite, quite entire, coriaceous. *Flowers* in usually axillary, often thyrsoid racemes; large, rosy or purple, pubescent. *Calyx* campanulate, irregularly 3–5-lobed. *Corolla-tube* incurved, upper lip erect, 2-lobed, lower spreading, 3-fid. *Stamens* 4, didynamous, ascending, exserted; anthers oblong, sagittate, cells parallel. *Style* long, tip incurved; stigma simple. *Capsule* oblong-ovoid, septicidal, many-seeded, valves long, separating from the placentiferous axis, which is 2-partite or entire. *Seeds* linear, ascending, nucleus slender, testa membranous, broadly winged all round; albumen 0; embryo straight. —DISTRIB. Species 3, all S.E. Asiatic.

The species of this genus exhibit the primarily epiphytic but subsequently arboreal habit characteristic of many species of *Ficus*. Though often loosely spoken of as parasites, and though, as a matter of fact, they frequently strangle the trees on which they become established, epiphytes of this class are not parasites in the physiological sense.

WIGHTIA BORNEENSIS, Hook. f. in Ic. Plant. XV. 35, t. 1444 (1883). A tree, 20 feet in height and upwards, commencing life as an epiphyte and flowering most freely in that condition. *Leaves* opposite, thinly coriaceous, glabrous as are the lenticellate branchlets, drying brown, margin entire, outline elliptic, apex obtusely acuminate, base cuneate, narrowed to the petiole, main-nerves 2–3-jugate; length 3 to 4 in., breadth 1·25 to 1·75 in.; petiole ·75 in. long. *Flowers* opposite or whorled on the rachis of axillary or terminal racemes, pedicels slender, rigid, spreading, ·5 in. long; rachis stout, glabrous, erect, 6–10-flowered, 3 to 6 in. long. *Calyx* campanulate, margin entire, ·4 in. across. *Corolla* trumpet-shaped, incurved, purple, densely beset with a fine stellate tomentum, 2 in. long, lobes rounded, throat slightly enlarged. *Stamens* inserted near base of corolla; filaments slender, far-exserted;

anthers sagittate. *Ovary* glabrous; style filiform; stigma simple. *Fruit* not seen.

PERAK: Larut Hill at 3,000 feet, *Derry* (Herb. Curtis, n. 3710) !—

DISTRIB. Borneo.

The solitary Perak specimen agrees well with a specimen from Borneo in Herb. Kew; as our Perak example is destitute of leaves the description of these is based on a second Bornean example of the plant. The species is most readily distinguished from the other two known species by its entire calyx-limb.

2. MAZUS, Lour.

Small herbs, often surculose. *Leaves* rosulate or opposite below, opposite or alternate above. *Flowers* in terminal, sub-second racemes; bracts minute or 0; bracteoles 0. *Calyx* campanulate, 5-fid; lobes large, leafy. *Corolla* 2-lipped; tube short, upper lip erect, ovate, 2-fid; lower longer, spreading, 3-fid; throat with a 2-lobed palate. *Stamens* 4, didynamous; anther-cells contiguous, divaricate. *Ovary* 2-celled; style short; stigma 2-lamellate; ovules numerous. *Capsule* globose or compressed, loculicidal, 2-valved, included. *Seeds* many, ovoid, very minute.—DISTRIB. Species about 5, Asiatic and Australian.

MAZUS RUGOSUS, Lour. Flor. Cochinchina. 385. A small annual glabrous or sparingly hirsute herb. *Leaves* many, radical, obovate-spathulate, irregularly coarsely crenate, narrowed to a short petiole, .75 to 3 in. long. *Seapes* numerous from the root, 2 to 10 in. long, leafless or with a few alternate spathulate leaves, with terminal racemes 1 to 6 in. long, the pedicels slender, .25 to .5 in. long, usually without bracteoles. *Calyx* campanulate, .25 in. long, lobes ovate-lanceolate, acute, half as long as tube, spreading in fruit. *Corolla* pale blue, .3 in. long. *Capsule* .2 in. long, included in the calyx; calyx-mouth in front .3 to .5 in. across. *Seeds* very minute; testa pale straw-coloured. Benth. in DC. Prod. X. 375; Boiss. Fl. Orient. IV. 424; Miq. Flor. Ind. Bat. II. 677; Hook. f. Flor. Brit. Ind. IV. 259. *M. bicolor*, Benth. in Wall. Cat. 3913. *M. vandelliioides*, Hance in Walp. Ann. III. 193. *Lindernia japonica*, Thunb. Flor. Japon. 253. *Hornemannia bicolor*, Willd. Enum. Hort. Berol. 654; Reichb. Icon. Exot. 25, t. 37. *Columnea tomentosa*, Roxb. Flor. Ind. III. 98. *Stemodia tomentosa*, G. Don Gen. Syst. Gard. IV. 842. *Tittmannia obovata*, Bunge Enum. Pl. Chin. 279. *Vandellia obovata*, Walp. Act. Acad. Leopold. XIX., Suppl. I. 394. *Gratiola goodeniæfolia*, Hornem. Hort. Hafn.

SINGAPORE: a garden weed, *Ridley* !—DISTRIB. E. and S.E. Asia generally.

3. ADENOSMA, R. Br.

Annual, villous or glandular aromatic herbs. *Leaves* opposite, rugose, crenulate. *Flowers* axillary or in leafy spikes, racemes or

heads; bracteoles conspicuous or absent. *Calyx* deeply 5-lobed; lobes imbricate, the upper the largest; sometimes in fruit all enlarged. *Corolla* 2-lipped; upper lip erect, entire or notched, outmost in bud; lower 3-lobed, spreading; throat not plicate; tube cylindric. *Stamens* 4, didynamous, included; anther-cells discrete, stipitate, one cell of each anterior stamen or of all four stamens empty. *Ovary* 2-celled; ovules in each cell numerous; style filiform below, winged upwards under the entire or 2-lamellate stigma. *Fruit* an ovoid, ellipsoid, or lanceolate 2-grooved and 4-valved capsule, opening both loculicidally and septicidally. *Seeds* many, minute, reticulate.—**DISTRIB.** Species about 10, in S.E. Asia and Australia.

Flowers axillary; outer fruiting sepals enlarged:—

Leaves ovate-obtuse, crenate-serrate	1. <i>A. ovatum</i> .
Leaves ovate-acute, serrate	2. <i>A. inopinatum</i> .

Flowers in terminal heads, spikes or racemes; sepals little altered:—

Bracts linear, hardly exceeding the calyx:—	
Spikes short, dense, cylindric or capitate	3. <i>A. capitatum</i> .
Spikes long, slender	4. <i>A. cœruleum</i> .
Bracts leafy, elliptic, acute, longer than calyx	5. <i>A. hirsutum</i> .

1. *ADENOSMA OVATUM*, Benth. in Hook. fil. Flor. Brit. Ind. IV. 263. A puberulous or glabrate herb, branched from the base; branches rooting below, prostrate or ascending, 6 to 18 in. long. *Leaves* ovate-obtuse, crenate-serrate, base wide-cuneate, rounded or truncate; blade .75 in. long, .5 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than the calyx. *Calyx* of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, pubescent, the 3 outer enlarged, .35 in. wide, ovate-cordate, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones. *Herpestis ovata*, Benth. Scroph. Ind. 30; Wall. Cat. 3896. *H. javanica*, Bl. Bijdr. 748. *Pterostigma ovatum*, Benth. in DC. Prod. X. 380; Miq. Flor. Ind. Bat. II. 678.

PERAK: Gunong Tundul, *Ridley* 9444! PENANG: Waterfall, *Curtis*! MALACCA: *Griffith*! SINGAPORE: Bukit Timah, *Ridley* 6894! "a garden weed," *Ridley* 8910!—**DISTRIB.** Indo-China, Malay Archipelago.

2. *ADENOSMA INOPINATUM*, Prain Journ. As. Soc. Beng. LXXII. 2, 16. A pubescent herb, branched from the base; branches rooting below, ascending, 6 to 18 in. long. *Leaves* ovate-acute, serrate, base cuneate; blade 1 to 1.5 in. long, .75 to 1 in. wide; petiole .3 in. *Flowers* axillary, sessile; bracts lanceolate, shorter than calyx. *Calyx*

of 5 almost free sepals; in flower herbaceous, sub-equal; in fruit membranous, reticulate, the 3 outer enlarged, .25 in. wide, ovate-lanceolate with truncate bases, the 2 inner unaltered, narrow lanceolate, all .25 in. long. *Corolla* blue. *Capsule* lanceolate, about as long as the sepals but hidden by the enlarged outer ones.

MALACCA: *Griffith*! SINGAPORE: *Anderson*! *King's Collector*!

Very nearly allied to *A. ovatum*, Benth., and *A. subrepens*, Benth. It differs from both by its acute leaves, but except in this respect and as regards its distribution it is hardly separable from *A. subrepens* of Ceylon. From *A. ovatum* of Tenasserim, with which it has been confused, it further differs in its larger size, coarser habit of growth, and much narrower outer sepals. It has also been confused with *A. cœruleum*, from which it differs by its flowers being all axillary and by its enlarged fruiting sepals.

3. *ADENOSMA CAPITATUM*, Benth. in Hook. f. Flor. Brit. Ind. IV. 264. A stout, erect, glandular-villous herb, 1 to 2 feet high. *Leaves* ovate or oblong, sub-acute, serrate, often reflexed; base cuneate; blade 1 to 2 in. long, .5 to .75 in. wide; petiole very short. *Flowers* in dense cylindric or globose terminal or axillary heads, with basal involucre of floral leaves; peduncles 1 in. or less, sometimes in the lower clusters sub-obsolete and the flowers in axillary whorls; heads usually .5 in. across, sometimes longer up to 4 in. long; bracts linear, hardly exceeding the sepals. *Calyx* of 5 almost free sepals, villous with long hairs, .25 in. long, the uppermost ovate-lanceolate, broader than the other lanceolate. *Corolla* blue. *Capsule* ovoid, .2 in. long. *Stemodia capitata*, Benth. in Bot. Reg. under t. 1470; Wall. Cat. 3926. *Pterostigma spicatum*, Benth. Scroph. Ind. 21. *P. capitatum*, Benth. Scroph. Ind. 31, and in DC. Prod. X. 380. *Erinus bilabiatus*, Roxb. Fl. Ind. III. 92.

PROV. WELLESLEY: *King*! *King's Collector*. PENANG: *Wallich*; *Deschamps*! *Curtis*! SINGAPORE: *King*! *Ridley*! MALACCA: *Cuming*! Ayer Keroh, *Ridley*! *Griffith*; *Wallich*. NEGRI SEMBILAN: Kwala Pedas, *Ridley*! PAHANG: *Ridley*!—DISTRIB. Throughout S.E. Asia.

4. *ADENOSMA CÆRULEUM*, R. Br. Prod. 443. An erect herb, 1 to 2 feet high, viscidly pubescent. *Leaves* ovate-acute, crenate, base rounded or cordate; blade 1.5 to 2.5 in. long, 1 to 2 in. wide; petiole .5 to 1 in. long. *Flowers* in long slender strict spikes; bracts lanceolate, about as long as calyx. *Calyx* of 5 almost free sepals, the upper lanceolate the rest linear, not very greatly altered in fruit. *Corolla* blue. *Capsule* lanceolate, rather longer than the sepals. Benth. Flor. Austral. IV. 484; Hook. f. Flor. Brit. Ind. IV. 263. *Pterostigma villosum*, Benth. Scroph. Ind. 21, and in DC. Prod. X. 380 partly; Miq. Flor. Ind. Bat. II. 678. *P. strictum*, Griff. Not. IV. 96; Ic. Pl. Asiat. t. 417, f. 3. *Stemodia cœrulea*, Benth. in DC. Prod. X. 381. *Herpestis lanuginosa*, Bl. Bijdr. 747.

SELANGOR: *Ridley* ! PERAK: *Seortechini* ! Wray ! MALACCA :
Griffith ! *Cuming* ! *Maingay* ; *Hervey* ! SINGAPORE : *Cuming* ! *Wallieh*.
 —DISTRIB. Indo-China, Malaya, Australia.

Seortechini notes on this, "aromatic ; most likely introduced." It appears, however, to be native.

5. *ADENOSMA HIRSUTUM*, Kurz Journ. As. Soc. Beng. XLV. 2. 143.
 A stout, erect, villous herb, 2 to 3 feet high. *Leaves* ovate or elliptic, sub-acute, serrate, base cuneate ; blade 1 to 2 in. long, .5 to .75 in. wide ; petiole very short or 0. *Flowers* in dense cylindric or oblong heads, often ternate, usually peduncled, with closely imbricate hirsute leafy bracts ; peduncles sometimes 1.5 in. long ; heads 1 to 3 in. long, .75 to 1 in. wide ; bracts ovate-acute, serrate, .4 to .6 in. long. *Calyx* of 5 almost free villous linear sepals, .25 in. long. *Corolla* blue. *Capsule* ovate, abruptly beaked, as long as calyx. *Pterostigma hirsutum*, Miq. Flor. Ind. Bat. Suppl. 562. *P. villosum*, Miq. l.c. (not of Benth.).

PROVINCE WELLESLEY : *Curtis* 2238 ! *Ridley* 6977 ! NICOBARS :
 Kamorta, Kurz !—DISTRIB. Sumatra (*Teysmann* 1157), Bangka (*Teysmann* 3429), Borneo (*Motley*, n. 215).

A coarser plant than *A. capitatum*, with leafy bracts throughout the spikes.

4. *LIMNOPHILA*, R. Br.

Herbs of marshes and pools, glabrous or pubescent, aromatic. *Leaves* with transparent dots, opposite or whorled, toothed or cut, when submerged frequently laciniate-multifid. *Flowers* solitary axillary, sessile or pedicelled, or passing into terminal spikes or racemes ; bracts leafy ; bracteoles small or obsolete. *Calyx* 5-partite ; lobes narrow, imbricate, all equal or the upper largest. *Corolla* 2-labiate ; upper lip outmost, sub-erect, entire or 2-fid ; lower spreading, 3-lobed ; throat not plicate ; tube cylindric. *Stamens* 4, didynamous, included ; anther-cells all perfect, usually discrete, stipitate, occasionally contiguous. *Ovary* 2-celled ; ovules in each cell numerous ; style slender, with deflexed tip and 2-lamellate stigma. *Fruit* an ovoid or oblong capsule, with both septicial and loculicidal dehiscence, the placentiferous septum separating from the valves. *Seeds* many, minute, angular and truncate, reticulate.—DISTRIB. Species about 25, in the tropics of the Eastern Hemisphere and Australia.

Leaves never pinnatifid above, very rarely so even on lower portion of stem :—

Flowers sessile :—

Leaves at least 1 in. long :—

Leaves petioled, 2 to 3 in. long, pubescent or glabrous .. 1. *L. Roxburghii*.

1. *LIMNOPHILA* ROXBURGHII, G. Don Gen. Syst. IV. 543 (*not of* Benth.). A stout glabrous or pubescent aromatic herb, with a creeping rootstock and with decumbent rooting base, giving off numerous erect stems 1 to 2 feet high. *Leaves* opposite, petioled, elliptic or ovate, obtuse or sub-acute, margin crenulate, base cuneate, punctate beneath, nerves distinct, 8 to 10 pairs; length up to 4 in., width to 2 in.; petiole .75 in. *Flowers* sessile, in axillary peduncled heads, rarely solitary. *Calyx* hirsute, .2 in. long; lobes lanceolate, finely acuminate in fruit, not striate. *Corolla* .35 in. long, purplish-blue with a yellow throat. *Capsule* .2 in. long, elliptic, sub-acute. Hook. f. Flor. Brit. Ind. IV. 265. *L. Menthastrum*, Benth. in DC. Prod. X. 386; Maxim. Mel. Biol. IX. 406. *Herpestis rugosa*, Roth Nov. Sp. 290. *Capraria gratissima*, Roxb. Fl. Ind. III. 92 (*in part*). *Stemodia Menthastrum*, Benth. Seroph. Ind. 23; Wall. Cat. 3927. *Adenosma triflora*, Seem. Fl. Vit. 184 (*not of* Nees). *Eclipta scabriuscula*, Wall. Cat. 3212.

The bases of the stems are often submerged, and besides the fibrous roots then emitted the lower nodes at times have multifid submerged leaves. The plant smells strongly of Aniseed.

2. *LIMNOPHILA BALSAMEA*, Benth. in DC. Prod. X. 386. A stoutish, softly pubescent herb; stem 1 to 2 feet high. *Leaves* opposite, elliptic, sub-acute, narrowed from the middle to the base with margin entire, beyond the middle obscurely crenulate, punctate beneath, nerves slender, 3 to 5 pairs; length up to 2 in., width to 1 in.; petiole 0. *Flowers* in short peduncled axillary heads or spikes. *Calyx* hirsute, .15 in. long; lobes lanceolate, finely acuminate; in fruit striate. *Corolla* .35 in. long. *Capsule* .2 in. long, broadly elliptic, obtuse. Hook. f. Flor. Brit. Ind. IV. 266. *Stemodia balsamea*, Benth. Scroph. Ind. 23; Wall. Cat. 3928.

PERAK: *King's Collector* 1027!—DISTRIB. Indo-China.

3. *LIMNOPHILA MICRANTHA*, Benth. in DC. Prod. X. 387. A small, stoutish, glabrous herb, creeping below; stem 3 to 6 in. long, branching from the base. *Leaves* all opposite, crowded, thick, .25 to .45 in. long, margin entire or very sparingly sub-serrate, punctate beneath; nerves obscure; petiole 0. *Flowers* axillary, sub-sessile, small. *Calyx* .06 in. long, glabrous; lobes subulate, in fruit striate. *Corolla* reddish-purple, .12 in. long. *Capsule* ovate, .08 in. long. Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia mierantha*, Benth. Scroph. Ind. 23; Wall. Cat. 3936. *Herpestris pygmaea*, Griff. Notul. IV. 104.

PAHANG: *Ridley*!—DISTRIB. Indo-China, Bengal.

4. *LIMNOPHILA VILLOSA*, Bl. Bijdr. 750. An erect or spreading, sub-simple, stoutish or slender, pubescent herb; stems 4 to 6 in. high. *Leaves* opposite, elliptic-oblong, sub-crenate, .5 to .75 in. long, punctate beneath, nerves obscure; petiole 0. *Flowers* axillary, solitary, on short pubescent pedicels, .15 in. long, erect in fruit. *Calyx* hirsute, .15 in. long, lobes lanceolate, acuminate-subulate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 681. *L. laxa*, Benth. in DC. Prod. X. 388 partly. *L. pulcherrima*, Hook. f. Flor. Brit. Ind. IV. 267. *Herpestis pulcherrima*, Griff. Notul. IV. 104.

PERAK: *Wray* 788! MALACCA: *Griffith*! *Cuming*! *Maingay*! *Ridley*! *Hervey*! PENANG: *Tulloh Bahang*, *Curtis*! *Ridley* 7104! PAHANG: *Ridley*! SINGAPORE: *King's Collector*! *Hullett*! *Desehamps*! *Kurz*! *Ridley*! PROVINCE WELLESLEY: *King*! SALAMA: *Seortechini*!—DISTRIB. Sumatra, Java.

5. *LIMNOPHILA HIRSUTA*, Benth. in DC. Prod. X. 388. An erect hirsute herb; stem 6 to 8 in. high. *Leaves* opposite or 3-4-nately whorled, elliptic, linear-oblong or sub-spathulate, 1.5 to 2.5 in. long, apex obtuse, margin serrulate, punctate beneath, nerves few, very indistinct; petiole short or obsolete. *Flowers* axillary, solitary or cymose or paniculate at the apex of the stem; pedicels .2 to .75 in.

bracteoles minute. *Calyx* .3 in. long, hirsute; lobes lanceolate, finely acuminate, in fruit striate. *Corolla* .5 in. long. *Capsule* sub-orbicular, .25 in. long. Hook. f. Flor. Brit. Ind. IV. 268. *L. javanica*, A. DC. in DC. Prod. X. 594. *Stemodia hirsuta*, Heyne, ex Wall. in Cat. 3930; Benth. Scroph. Ind. 24. *Ambulia ebraeata*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 268.

NICOBARS: *Kurz!* PERAK: *Seorteehini!* *Kunstler!* MALACCA: *Ridley!*—DISTRIB. India, Indo-China, Malay Archipelago, China.

6. LIMNOPHILA PYGMÆA, Hook. f. Flor. Brit. Ind. IV. 268. A very small, glabrous, much-branched creeping herb; branches 4 to 6 in. long, divaricate. *Leaves* opposite, .3 to .4 in. long, oblong-lanceolate, apex acute, margin sub-serrate; punctate beneath, nerves very obscure; petiole 0. *Flowers* axillary, solitary, pedicels slender, .15 to .2 in. long, erect in fruit. *Calyx* .15 in. long, hirsute, lobes subulate-lanceolate, striate in fruit. *Corolla* .2 in. long. *Capsule* .15 in., ovate. *Herpestis pygmæa*, Griff. Notul. IV. 104. *Stemodia diffusa*, Benth. in Wall. Cat. 3937.

MALACCA: *Griffith!* *Cuming!*—DISTRIB. Tenasserim.

7. LIMNOPHILA ERECTA, Benth. in DC. Prod. X. 388. An erect, sub-simple or branched, stoutish glabrous herb; stems 4 to 8 in. high. *Leaves* all opposite, linear-oblong, .5 to 1 in. long, apex acute, margin sub-serrate except the narrow cuneate base, punctate beneath, nerves obscure; petiole very short or obsolete. *Flowers* white, axillary, solitary, on short pedicels, .1 in. long, recurved in fruit. *Calyx* glabrous, .15 in. long, lobes lanceolate, acuminate, in fruit striate. *Corolla* .2 in. long. *Capsule* .15 in. long, ovate. Maxim. Mel. Biol. IX. 406; Hook. f. Flor. Brit. Ind. IV. 267. *Stemodia gratioloides*, Benth. Scroph. Ind. 25; Wall. Cat. 3938.

PERAK: *Seorteehini!* *Wray!* *King's Collector!* NEGRI SEMBILAN: *Ridley!* SELANGOR: *Ridley!* PAHANG: *Ridley!*—DISTRIB. Indo-China, Bengal, S. China.

8. LIMNOPHILA GRATISSIMA, Bl. Bijdr. 749. An erect, glabrous herb with a stout stem, 1 to 2 feet high, simple or occasionally branched above. *Leaves* opposite and ternate, half-amplexicaul, linear-oblong, 1.5 to 2.5 in. long, apex sub-acute, margin serrulate, punctate beneath, nerves few, indistinct; petiole 0. *Flowers* in axillary and terminal many-flowered racemes, rarely flowers axillary solitary, sometimes the racemes 12 in. long and paniculately branched with the flowers whorled, at others the racemes reduced; pedicels .5 to 1 in. long, glandular; bracteoles minute. *Calyx* .3 in. long, glabrate, lobes lanceolate-acuminate; in fruit calyx hemispherical with lobes striate. *Corolla* .5 in. long. *Capsule* oblong, acute, .3 in. long, Benth. Scroph. Ind. 26;

Wall. Cat. 3906; Hook. f. Flor. Brit. Ind. IV. 268. *L. punctata*, Bl. Bijdr. 750; Benth. in DC. Prod. X. 388; Miq. Flor. Ind. Bat. II. 682; Maxim. Mel. Biol. IX. 406. *Gratiola aromatica*, Pers. Synops. I. 14. *Ambulia aromatica*, Lamk Encycl. Meth. I. 128. Rheede Hort. Malab. X. 6.

MALACCA: *Griffith*. PERAK: *King's Collector! Wray!*—DISTRIB. S.E. Asia generally, N. Australia.

9. *LIMNOPHILA SESSIFLORA*, Blume Bijdr. 750. A hirsute or rarely glabrate herb; stem stoutish, 4 to 8 in. long. *Leaves* 3 to 6 in a whorl throughout all lobulate or pinnatisect, or the uppermost very rarely opposite entire, usually about .4 to .5 in. long. *Flowers* axillary solitary, sessile or shortly pedicelled. *Calyx* .3 in. long, lobes ovate-acuminate, tube in fruit membranous, hemispheric, not striate. *Corolla* .5 in. long. *Capsule* orbicular, turgid, .2 in. across. Benth. Scroph. Ind. 25; Wall. Cat. 3902; DC. Prod. X. 389; Miq. Flor. Ind. Bat. II. 683; Hook. f. Flor. Brit. Ind. IV. 270. *Hottonia sessiliflora*, Vahl Symb. II. 36.

KEDAH: Langkawi, in swamps, *Curtis!*—DISTRIB. Throughout S.E. Asia.

10. *LIMNOPHILA HETEROPHYLLA*, Benth.; var. *reflexa*, Hook. f. Flor. Brit. Ind. IV. 270. A glabrous herb with a very slender elongated stem, 1 to 1.5 feet long. *Leaves* towards apex of stem usually opposite, small, rarely over .25 in. long, sessile, half-amplexicaul, oblong, margin crenulate; followed by pinnatifid leaves 4 to 6 in a whorl, .5 in. long; with below these submerged whorled and very finely capillary-multifid leaves, .5 in. long. *Flowers* axillary solitary, the upper sub-sessile passing into a short leafy spike, the lower pedicelled, with pedicels recurved in fruit and longer than the calyx. *Calyx* .25 in. long, lobes ovate, very shortly acuminate, in fruit not at all striate; tube in fruit hemispheric, membranous. *Corolla* .4 in. long. *Capsule* sub-globose, .3 in. long. *L. reflexa*, Benth. Scroph. Ind. 25; DC. Prod. X. 389; Wall. Cat. 3904.

MALACCA: *Cuming*. KEDAH: *Curtis* 2103!—DISTRIB. (of variety,) Tenasserim: (of type,) throughout S.E. Asia.

This variety differs from the type in having distinctly shorter *submerged* leaves, and distinctly longer pedicels to the lower flowers.

11. *LIMNOPHILA GRIFFITHII*, Hook. f. Flor. Brit. Ind. IV. 271. A very small herb with creeping tufted stems, sending down long rigid roots and emitting many erect branches, 1 to 2 in. long, sometimes stout and stiff, sometimes slender and flaccid. *Leaves* .25 to .35 in. long, usually densely whorled and imbricated, multifid. *Flowers* axillary solitary, on slender pedicels, .35 to .5 in. long, that are deflexed

in fruit. *Calyx* .1 in. long, teeth short. *Corolla* pure white, .4 in. long. *L. sessiliflora*, Griff. Notul. IV. 99, t. 418, f. 5 (not of Bl.). *L. gratio- loides* var. *myriophylloides*, Benth. in DC. Prod. X. 389 partly. *Quin- quelobus glaber*, Benj. in Linnæa XX. 316. *Benjaminea glabra*, Benj. in Linnæa XX. 761.

MALACCA : Griffith ! Leman, Cuming ! Maingay ! PERAK : King's Collector !

Griffith's specimens have slightly larger leaf-segments and shorter pedicels than those of Maingay, Cuming, and Kunstler, where the leaf-segments are finely capillary. But Griffith's plant evidently grew on mud, while that of Kunstler was floating in water, and the difference of habitat probably sufficiently explains the difference in foliage. The flowers of the two forms are the same.

5. HERPESTIS, Gaertn. f.

Herbs, glabrous. *Leaves* often dotted, entire or toothed, or below submerged and multifid. *Flowers* axillary or racemose ; bracteoles small or obsolete. *Calyx* 5-partite ; lobes imbricate, the upper largest, the two lateral inmost often very narrow. *Corolla* indistinctly 2-lipped ; upper lip outmost spreading, 2-lobed or only emarginate, lower 3-lobed ; tube cylindric. *Stamens* 4, didynamous, included ; anthers sometimes approximate in pairs ; cells contiguous, parallel, not confluent. *Ovary* 2-celled ; ovules in each cell numerous ; style dilated at the top ; stigma entire or 2-lobed. *Fruit* a globose or ovoid 2-celled capsule ; valves 2 or 4, separating from the placentiferous septum. *Seeds* many, very minute.—DISTRIB. Species about 50, throughout the tropics.

HERPESTIS MONNIERIA, H. B. & K. Nov. Gen. and Sp. II. 366. A glabrous, rather succulent creeping herb, rooting at the nodes ; branches 4 to 10 in. long. *Leaves* obovate-oblong, spathulate, sessile, obtuse, entire, .5 to .75 in. long. *Flowers* axillary, peduncles usually .75 to 1 in. long ; bracteoles 2. *Calyx* of 5 nearly free sepals, .2 to .3 in. long, the upper sepal ovate. *Corolla* white, faintly tinged with blue, .4 to .6 in. long, lobes sub-equal. *Capsule* ovoid, acute, hidden by the sepals, .15 to .25 in. long. *Seeds* minute, irregular ; testa pale. Benth. Scroph. Ind. 30, and in DC. Prod. X. 410 ; Wall. Cat. 3900 ; Dalz. & Gibs. Bomb. Flor. 178 ; Miq. Flor. Ind. Bat. II. 685 ; Bot. Mag. t. 2557 ; Boiss. Flor. Orient. IV. 426 ; Hook. f. Flor. Brit. Ind. IV. 272. *H. spathulata*, Bl. Bijdr. 748. *Gratiola Monnieria*, Linn. Cent. Pl. II. n. 120 ; Roxb. Cor. Pl. II. 41, t. 178, and Flor. Ind. I. 141. *Septis repens*, Lour. Flor. Cochinchin. 392. *Bramia indica*, Lamk Encyc. I. 459. Rheede Hort. Malab. X. t. 14.

MALACCA : Hervey ! JOHORE : Hullett ! SINGAPORE : Kurz ! Ridley !—DISTRIB. Throughout the tropics. .

6. TORENIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, entire or crenate or serrate. *Flowers* often showy, axillary, or in terminal or pseudo-axillary racemes or umbels; bracteoles 0. *Calyx* 2-lipped or 3-5-toothed, 3-5-keeled or -winged or -folded. *Corolla* 2-lipped; upper lip outmost erect, concave or pinched, notched or 2-fid; lower larger spreading, 3-lobed; tube cylindric, somewhat curved, dilated upwards. *Stamens* 4, didynamous; upper pair included inserted on corolla-tube; lower inserted on throat, appendaged or not at base, and connivent under upper lip; anthers contiguous or connate in pairs, cells often confluent. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a linear or oblong, included septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, rugose or cancellate.—DISTRIB. Species 20, Tropical Asiatic and African, one American.

Calyx very distinctly winged:—

Fruiting calyx sub-orbicular, as broad as long; stems prostrate and rooting 1. *T. polygonoides*.

Fruiting calyx longer than broad; stems erect:—

Wings broad distinctly decurrent on the pedicels; corolla very little exserted; bracteoles very small; pedicels shorter than the calyx 2. *T. peduncularis*.

Wings narrow hardly decurrent on the pedicels; corolla distinctly exserted; bracteoles large; pedicels as long as or longer than the calyx 3. *T. ciliata*.

Calyx hardly or not at all winged:—

Flowers all axillary:—

Stems and leaves glabrous; calyx deeply lobed, faintly winged 4. *T. asiatica*.

Stems and leaves hirsute; calyx wingless, shortly lobed .. 5. *T. Benthamiana*.

Flowers in terminal racemes; stems and leaves hirsute; calyx wingless, shortly lobed 6. *T. flava*.

1. *TORENIA POLYGONOIDES*, Benth. Scroph. Ind. 39. A slender straggling herb; branches 6 to 12 in. long, decumbent and often rooting at the nodes; all parts glabrous. *Leaves* orbicular-ovate, serrate; lamina 4 to 5 in. long, 35 to 45 in. wide, apex acute or sub-acute, base cuneate; petiole slender, 25 in. long. *Flowers* axillary on 2-4-flowered peduncles; pedicels 25 in. long, slender; bracteoles minute. *Calyx* tubular with very wide wings, in fruit sub-orbicular 3 in. in diam. *Corolla* 35 in. long, white or white and pink, distinctly exserted. DC. Prod. X. 409; Miq. Flor. Ind. Bat. II. 688; Hook. f. Flor. Brit. Ind. IV. 276. *T. cardiosepala*, Benth. in DC. Prod. X. 409. *Herpestis polygonoides*, Benth. in Wall. Cat. 3897.

SINGAPORE: Wallich 3897! King's Collector! Hullett! Murton, Kuntze! Schomburgk! Anderson! Kurz! MALACCA: Maingay! Griffith! Goodenough! PENANG: Bouton; Deschamps! PERAK: Gapis Pass, Curtis 2683!

2. *TORENIA PEDUNCULARIS*, Benth. in Wall. Cat. 3956. An erect annual herb 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with recurved hairs. *Leaves* ovate-lanceolate, base cordate, apex acuminate, margin serrate; lamina membranous 1 to 2 in. long, .5 to 1 in. wide, sparingly hairy on both surfaces; petiole slender, sparsely hirsute, .5 to .75 in. long. *Flowers* axillary solitary, or the uppermost in a sub-umbellate corymb or a terminal raceme, the lowest in the raceme leaf-opposed; pedicels .3 in., in fruit .5 in. long, thickened upwards, shorter than the calyx; bracteoles linear-subulate small. *Calyx-tube* narrow-ovate, .6 in., in fruit .85 in. long, wings broad, decurrent on the pedicel, the margins ciliate. *Corolla* .75 in. long, little exserted, tube yellow below, pale blue above, lateral lobes of lip with darker blotches. *Stamens* with glabrous filaments not appendaged. *Disk* cupular. Hook. f. Flor. Brit. Ind. IV. 276. *T. edentula*, Benth. in DC. Prod. X. 410; Bot. Mag. t. 4229.

PENANG: Schomburgk! MALACCA: Goodenough! PERAK: Scortechini! Ridley 9457! 9758! Ipoh, Curtis! NIOBARS: Kamorta, Kurz!—DISTRIB. Indo-China, Java, Timor.

3. *TORENIA CILIATA*, Sm. in Rees Cyclop. V. 36. An erect annual herb, 1 to 2 feet high, branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles. *Leaves* ovate, base wide cuneate, apex obtuse or sub-acute, margin entire or crenate; lamina membranous 1.5 to 2.5 in. long, .75 to 1.25 in. wide, sparingly hairy on both surfaces; petiole winged above .25 to .5 in. long, sometimes shorter. *Flowers* in distant pairs, racemed at the ends of the branches; pedicels .3 in., in fruit .4 in. long, thickened upwards, as long as or longer than the calyx; bracteoles .3 in. long, linear, hirsute, as long as the flowering pedicels. *Calyx* very narrow-tubular, .4 in., in fruit .6 in. long, wings distinct but narrow, the margins ciliate. *Corolla* .75 in. long, distinctly exserted, light blue. Benth. in DC. Prod. X. 411; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 279. *T. racemosa*, Benth. Scroph. Ind. 38 (not of Griff.). *T. cœrulea*, Miq. Flor. Ind. Bat. Suppl. 562. *T. flava*, Wall. Cat. 3957 (in part); Miq. Flor. Ind. Bat. Suppl. 562 (not of Ham).

PENANG: Wallich! Deschamps! PERAK: King's Collector! Scortechini! Ridley!—DISTRIB. Sumatra, Timor.

Very near to *T. peduncularis*, and really only separable by its smaller more winged calyx. It may be remarked that Kurz in Herb. Calcutta has suggested that *T. ciliata*

is = *T. peduncularis*, while in the field Scortechini has named *T. peduncularis*, "*T. ciliata*."

4. *TORENIA ASIATICA*, Linn. Sp. Pl. 619. A sub-erect or spreading slightly branching herb, stems quadrangular glabrous. *Leaves* ovate-lanceolate, base cuneate, margin finely serrate; lamina 1·5 to 2·5 in. long, 1 to 1·5 in. wide, membranous, glabrous; petiole slender, glabrous, ·5 in. long. *Flowers* axillary, pedicels ·5 in. long; bracteoles minute subulate. *Calyx* ·5 in. long, deeply 5-partite, lobes narrow-lanceolate, with a prominent midrib. *Corolla* 1·5 in. long, tube narrow-cylindric at base, infundibuliform above, dark violet on both sides, upper lobe erect, lip 3-lobed spreading, all yellowish. *Stamens* with appendages on anterior filaments. *Disk* cupular waved. Wight Ic. t. 862; Benth. in DC. Prod. X. 410; Wall. Cat. 3953 A. B.; Miq. Flor. Ind. Bat. II. 689; Gaertn. Fruct. III. 29, t. 184; Lamk Ill. t. 523; Bot. Mag. t. 4249; Lem. Ill. Hort. t. 199; Flore des Serres II. t. 157; XIII. t. 1342; Hook. f. Flor. Brit. Ind. IV. 277. *Treisteria cordata*, Griff. Notul. IV. 109. Rheede Hort. Malab. IX. t. 53.

PERAK: *Scortechini* 2212! *Ridley* 5307! 9756! *King's Collector* 1816! *Curtis*! SELANGOR: *Ridley* 8533!—DISTRIB. India, Sumatra, Java, Indo-China, China.

5. *TORENIA BENTHAMIANA*, Hance Ann. Sc. Nat. Ser. 4. XVIII. 226. A slender straggling herb; branches 6 to 10 in. long, decumbent and often rooting at the nodes, all parts sparingly hirsute. *Leaves* ovate, acute, margin serrate; lamina ·5 to ·75 in. long, ·3 to ·4 in. wide, base truncate or cuneate; petiole ·25 in. long. *Flowers* axillary, solitary, pedicels ·75 to 1·25 in. long, slender; bracteoles minute. *Calyx* very narrow-tubular, ·35 in. long, in fruit ·5 in. long, keeled and channelled but not winged, hirsute with sparse spreading hairs. *Corolla* 1·25 in. long, distinctly exserted; tube violet purple, limb yellow. *T. Bailloni* Godef. in Ill. Hort. XXV. t. 324; E. Morr. in Belg. Hort. XXIX. t. 9, f. 2. *T. flava*, Bot. Mag. t. 6700 (*not of Ham.*).

JOHORE: *Ridley* 4160!—DISTRIB. Siam, Cochinchina, S. China.

6. *TORENIA FLAVA*, Ham. in Wall. Cat. 3957. An erect annual herb, 1 to 2 feet high; branches acutely 4-gonous, uniformly hairy upwards, below ciliate only on the angles with spreading hairs. *Leaves* ovate or ovate-oblong, base wide-cuneate, margin entire or crenate; lamina membranous 1 to 1·5 in. long, ·7 to 1 in. wide, hairy on both surfaces; petiole winged above, often very short. *Flowers* racemed at the ends of the branches; pedicels ·2 in., in fruit ·3 in. long, thickened upwards, shorter than the calyx; bracteoles ·4 in. long linear, hirsute, rather longer than the fruiting pedicels. *Calyx* very narrow-tubular ·35 in., in fruit ·5 in. long, keeled and channelled but not winged, hirsute

throughout with sparse spreading hairs. *Corolla* .75 in. long, distinctly exserted, bright yellow. Benth. Scroph. Ind. 38, and in DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 689; Hook. f. Flor. Brit. Ind. IV. 278. *Pentstemon racemosus*, Griff. Notul. IV. 120. *Mimulus hirsutus*, Bl. Bijdr. 756.

PERAK: *Kunstler* 904!—DISTRIB. Indo-China, Malaya.

7. VANDELLIA, Linn.

Herbs, glabrous or pubescent. *Leaves* opposite, often toothed, usually penninerved. *Flowers* small, axillary or racemose; bracteoles 0. *Calyx* campanulate, 5-toothed, or oftener deeply 5-partite, neither keeled nor winged. *Corolla* 2-lipped; upper lip outmost, erect, concave, emarginate or 2-fid; lower wider, spreading, 3-lobed; tube cylindric. *Stamens* 4, didynamous; the posterior pair inserted in corolla-tube, usually included, the anterior pair inserted on corolla-throat, with arched filaments appendaged near the base; anthers contiguous or connate in pairs under upper lip, cells divaricate. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose or ovoid, or long cylindric, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species about 30, mostly S.E. Asiatic.

Capsule about equalling or shorter than the calyx:—

Calyx very shortly 5-lobed 1. *V. crustacea*.

Calyx divided almost to the base in 5 sepals:—

Sepals longer than the capsule:—

Stems erect; all parts sparsely beset with spreading hairs;
leaves entire or sinuate 2. *V. hirsuta*.

Stems procumbent; all parts softly villous; leaves crenate-
serrate 3. *V. mollis*.

Sepals not longer than the capsule:—

Leaves sessile 4. *V. scabra*.

Leaves petioled 5. *V. elata*.

Capsule much longer than the calyx 6. *V. pedunculata*.

1. VANDELLIA CRUSTACEA, Benth. Scroph. Ind. 35. A diffusely trichotomously branched, glabrous or sparsely hairy herb; branches mostly from near the root; stems 4 to 18 in. high. *Leaves* ovate or lanceolate, entire or serrate; lamina .5 to 1 in. long, .25 to .5 in. wide; petioles short. *Flowers* axillary or sub-racemose; pedicels slender, strict, .5 to 1.5 in. long. *Calyx* shortly 5-lobed, in flower .1 in., in fruit .15 in. long. *Corolla* pale purple or white. *Capsule* ovate-oblong, obtuse, .12 in. long. DC. Prod. X. 413; Wight Ic. t. 863; Miq. Flor. Ind. Bat. II. 690; Hook. f. Flor. Brit. Ind. IV. 279. *V. alba*, Benth.

Scroph. Ind. 35. *Torenia varians*, Roxb. Fl. Ind. III. 96. *T. lucida*, Ham. in Wall. Cat. 3962. *T. alba*, Ham. in Wall. Cat. 3961 *partly*. *T. flaccida*, R. Br. Prod. 440. *Gratiola lucida*, Vahl Enum. I. 95; Roxb. Cor. Pl. II. 2, t. 202, and Flor. Ind. I. 138. *G. aspera*, Roth Nov. Pl. II. *Peristeira paniculata*, Griff. Notul. IV. 119. *Capraria crustacea*, Linn. Mant. 87. *Morgania lucida*, Spreng. Syst. II. 802. *M. aspera*, Spreng. Syst. II. 803. *Mimulus javanicus*, Bl. Bijdr. 283. *Hornemannia ovata*, Link & Otto Ic. Pl. Sel. I. 9, t. 3. *Tittmannia ovata*, Reichb. Icon. Exot. I. 27. *Antirrhinum hexandrum*, Forsk. Flor. Ægypt.-Arab. 43. Rumph. Herb. Amb. V. t. 170, f. 3.

PENANG: *Curtis*! PROV. WELLESLEY: *King*! PERAK: *Curtis*! SINGAPORE: *Wallich*! *Schomburgk*! *Ridley*! *Hullett*! *Kunstler*! *Deschamps*! *Kurz*! PAHANG: *Ridley*! MALACCA: *Hervey*!—DISTRIB. Cosmopolitan in the tropics.

2. VANDELLIA HIRSUTA, Benth. Scroph. Ind. 36. An erect succulent trichotomously branched herb, 4 to 6 in. high, sparsely clothed with spreading hairs. *Leaves* ovate or oblong, obtuse, entire or sinuate, 1 to 3 in. long; upper sessile .5 to 1 in. wide, lower petioled, .4 to .75 in. wide. *Flowers* minute in many-flowered racemes; pedicels slender, .15 to .2 in. long. *Sepals* lanceolate .08 in., in fruit .1 in. long. *Corolla* blueish-white. *Capsule* orbicular .08 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia ovata*, Benth. in Wall. Cat. 3942. *T. viscosa*, Reichb. Ic. Exot. I. 26, t. 38. *Hornemannia prostrata*, Jacq. Ecl. t. 150.

PERAK: *Kunstler*! PAHANG: *Ridley*! SINGAPORE: *Ridley* 2701! —DISTRIB. S.E. Asia generally.

3. VANDELLIA MOLLIS, Benth. Scroph. Ind. 37. A procumbent herb; stems creeping below, 6 to 18 in. long, slender or stoutish, softly villous with spreading white hairs. *Leaves* ovate or ovate-oblong, obtuse or sub-acute, margin crenate-serrate; both surfaces softly villous with white glistening hairs; nerves 3 to 4 pairs, oblique, ascending; length 1 to 1.5 in., width .5 to .75 in.; petiole short, .2 in. long or less. *Flowers* on axillary pedicels or in axillary or terminal racemes, the pedicels slender, softly villous, .25 to .75 in. long. *Sepals* subulate-lanceolate, softly villous with white hairs, .4 to .5 in. long. *Corolla* .5 to .6 in. long, tube white, upper lip brown and lower lip yellow. *Stamens* with filaments hirsute below, the upper pair with orbicular basal processes. *Capsule* oblong, .2 in. in diam. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 281. *Tittmannia hirta*, Benth. in Wall. Cat. 3948.

SELANGOR: Rawang, *Ridley* 7605!—DISTRIB. Eastern Himalaya, S. China, Indo-China, Sumatra, Java.

4. *VANDELLIA SCABRA*, Benth. Scroph. Ind. 36. A slender diffusely branched herb with rather rigid stems and branches, the latter 2 to 4 in. long; more or less clothed everywhere with long white spreading hairs. *Leaves* broadly ovate or ovate-cordate, or orbicular, serrate or entire, acute or obtuse; lamina .3 to .6 in. long, .3 in. wide. *Flowers* axillary or terminal, on slender capillary pedicels .5 to 1.5 in. long, strict, spreading in fruit, much longer than calyx. *Sepals* lanceolate, hirsute or glabrous, .1 in. long. *Corolla* .3 in. long. *Capsule* orbicular .1 in. long. DC. Prod. X. 414; Miq. Flor. Ind. Bat. II. 692; Griff. Notul. IV. 122, and Ic. Pl. Asiat. t. 418, f. 4; Hook. f. Flor. Brit. Ind. IV. 281. *V. monnieroides*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Torenia hirta*, Cham. & Schlecht. Linnæa II. 571. *T. globosa*, Ham. ex Hook. f. Flor. Brit. Ind. IV. 281. *Gratiola pusilla*, Willd. Sp. Pl. I. 105. *Columnnea minuta*, Roxb. Flor. Ind. III. 98. *Tittmannia pusilla*, Benth. in Wall. Cat. 3945 partly. *T. sulcata*, Wight in Wall. Cat. 3946 partly. *Bomaya VahlII*, G. Don Gen. Syst. IV. 538. *Stemodia minuta*, G. Don Gen. Syst. IV. 542. *Selago pusilla*, Thunb. Prod. Fl. Cap. 99.

MALACCA: *Griffith!* PROV. WELLESLEY: *King!* NEGRI SEMBILAN: Serembam, *Ridley* 10090! SINGAPORE: *King's Collector!* *Ridley!*—DISTRIB. S.E. Asia generally, Africa, Madagascar.

5. *VANDELLIA ELATA*, Benth. Scroph. Ind. 36. A slender, sub-erect or diffuse, glabrous or sparingly hirsute herb; stems simple or dichotomously branched, sometimes rooting near the base; branches slender, 6 to 8 in. long or longer. *Leaves* ovate, coarsely crenate-toothed, acute, base cuneate entire passing into the petiole; lamina .3 to .5 in. long, .25 to .3 in. wide; petiole .15 to .25 in. *Flowers* axillary or terminal, on slender capillary pedicels .3 to .5 in. long, strict, somewhat spreading in fruit, much longer than calyx. *Sepals* narrow-lanceolate, sparingly hirsute, .09 in. long. *Corolla* very small, pale blue, .1 in. long. *Capsule* broadly oblong, .12 in. long, as long as the fruiting sepals. DC. Prod. X. 414; Hook. f. Flor. Brit. Ind. IV. 280. *Tittmannia elata*, Benth. in Wall. Cat. 3944.

SINGAPORE: *Ridley!*—DISTRIB. Tenasserim, Borneo.

6. *VANDELLIA PEDUNCULATA*, Benth. Scroph. Ind. 37. A slender glabrous herb, stem sometimes creeping at the base; branches slender, 4 to 10 in. long, prostrate. *Leaves* ovate, obtuse or sub-acute, obscurely crenate-toothed, .5 to 1 in. long, .4 in. wide, shortly petioled. *Flowers* axillary and in terminal racemes; pedicels slender 1.5 in. long, usually twice as long as leaves or longer. *Sepals* 5, narrowly lanceolate, free almost to the base, .25 in. long. *Corolla* white, or pale blue with a white spot. *Capsule* linear-lanceolate, .5 in. long. DC. Prod. X. 416;

Griff. Notul. IV. 120; Ic. Pl. Asiat. t. 418, f. 2; Hook. f. Flor. Brit. Ind. IV. 282. *V. Roxburghii*, G. Don Gen. Syst. IV. 549. *V. cordifolia*, G. Don. Gen. Syst. IV. 549. *Gratiola cordifolia*, Vahl Enum. I. 97; Don Prod. 85. *Bonnaya cordifolia*, Spreng. Syst. I. 42. *Tittmannia grandiflora*, Benth. in Wall. Cat. 3949. *Torenia diffusa*, Roxb. Fl. Ind. II. 95. *T. varians*, Griff. Notul. IV. 125 (not of Roxb.).

MALACCA: *Hervey!* SINGAPORE: *King's Collector! Thomson! Ridley!* JOHORE: *Ridley!* PERAK: *Wray! Scortechini! Ridley!* PENANG: *Curtis!*—DISTRIB. S.E. Asia generally.

8. ARTANEMA, Don.

Herbs with rather tall, erect, angled stems. *Leaves* opposite, entire or serrate, scabrid above as are the stem-angles. *Flowers* large, blue, pink or white, in terminal racemes; bracts leafy; bracteoles obsolete. *Calyx* 5-partite; lobes acuminate, smooth, much dilated. *Corolla* 2-lipped; upper lip outmost, erect, broad, emarginate; lower 3-lobed, spreading; throat not plicate; tube wide-cylindric. *Stamens* 4, didynamous; posterior pair short included, anterior pair long with arching filaments dilated at the base; anther-cells confluent at their tips. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a globose septicidal capsule; valves 2, separating from the placentiferous septum. *Seeds* many, small, rugose.—DISTRIB. Species 3 to 4, in tropics of Eastern Hemisphere and Australia.

Leaves shortly petioled; flowers over .5 in. long .. 1. *A. sesamoides*.
Leaves sessile, narrower; flowers under .5 in. long.. 2. *A. angustifolium*.

1. ARTANEMA SESAMOIDES, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* shortly petioled, lanceolate-acuminate, entire or serrate, 2 to 4 in. long, .75 to 1.25 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .3 to .5 in. long, usually slightly exceeding the calyx. *Calyx* of 5 sub-equal lobes, .25 to .3 in. long. *Corolla* blue, .75 in. long. *Capsule* globose, .3 in. in diam. DC. Prod. X. 408; Wight Ic. t. 1410; Miq. Flor. Ind. Bat. II. 686; Hook. f. Flor. Brit. Ind. IV. 274. *Columnnea longifolia*, Linn. Mant. 90. *Achimanes sesamoides*, Vahl Symb. II. 71. *Diceros longifolius*, Pers. Synops. II. 164; Bl. Bijdr. 751; Wall. Cat. 3884.

PENANG: Pulo Boutong, *Curtis!*—DISTRIB. S.E. Asia generally.

2. ARTANEMA ANGUSTIFOLIUM, Benth. Scroph. Ind. 39. A herb, 2 to 3 feet high. *Leaves* sessile, lanceolate to linear-lanceolate, 3 to 4 in. long, .25 to .75 in. wide. *Flowers* in racemes 6 to 9 in. long; pedicels .15 in. long, always shorter than the calyx. *Calyx* of 5 sub-equal sepals, .2 in. long. *Corolla* pale blue and white, or pink or white, .3 to .4 in.

long. *Capsule* globose, .2 in. in diam. DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Diceros angustifolius*, Wall. Cat. 3885.

PENANG: *J. Scott*! *Ridley* 9412! PERAK: *Seorteekini*! *Wray* 2246! 2721! *King's Collector* 3045! PAHANG: *Ridley* 2165A! SINGAPORE: *Wallich* 3885! SELANGOR: *Sepang*, *Ridley* 7604! JOHORE: *Serom*, *Ridley* 11134!

Very nearly related to *A. sesamoides*, which differs chiefly by its larger blue flowers and larger capsules.

9. CURANGA, JUSS.

Herb, creeping or diffuse. *Leaves* opposite, ovate, crenate. *Flowers* in short terminal or pseudo-axillary racemes; bracts small, leafy; bracteoles 0. *Calyx* deeply 4-partite; upper and lower lobes very large, lateral small and narrow. *Corolla* 2-lipped; upper lip outmost, wide-arched, emarginate; lower longer, spreading, 3-lobed; tube short. *Stamens* 2, only the upper pair perfect, included, inserted on corolla-tube; anthers connate with divaricate cells; lower pair of stamens replaced by 2 clavate staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* an orbicular septicidal capsule, covered by the accrescent calyx-lobes, valves separating from the broad placentiferous septum. *Seeds* many, rugose.—DISTRIB. Species 2, S.E. Asiatic.

CURANGA AMARA, JUSS. Ann. Mus. IX. 320. An annual glabrous herb, with slender straggling divaricate branches, 2 to 3 feet long, rooting at the lower nodes. *Leaves* very bitter, ovate, crenate, obtuse or acute, base truncate rounded or cuneate, entire; blade 2 to 2.5 in. long, 1.5 to 2 in. wide; petiole very slender, .5 to .75 in. long. *Flowers* in short, few-flowered racemes, 2 to 2.5 in. long; pedicels .25 to .3 in., in fruit .5 in. long. *Calyx* with the outer sepals broadly ovate-cordate, membranous, reticulate, in flower .25 in., in fruit .5 in. long. *Corolla* brownish-red. *Capsule* small, compressed, .15 in. across. Benth. in DC. Prod. X. 408; Hook. f. Flor. Brit. Ind. IV. 275. *Caranga amara*, Vahl Symb. I. 100. *Gratiola amara*, Roxb. Flor. Ind. I. 136. *Herpestis amara*, Benth. Scroph. Ind. 30. *Symphillium torenioides*, Griff. in Madr. Journ. Nat. Sc. IV. 1, t. 11. *Treisteria assamiea*, Griff. Notul. IV. 111. Rumph. Herb. Amboin. V. t. 170, f. 1.

PERAK: *Seorteekini* 499B! *Ridley* 9742! PAHANG: *Ridley* 1346! SELANGOR: *Ridley* 8214!—DISTRIB. East Himalaya, Indo-China, Malaya, Philippines.

10. BONNAYA, Link & Otto.

Herbs, annual, glabrous. *Leaves* opposite, serrate or entire. *Flowers* solitary axillary, often passing into terminal racemes; bracteoles 0.

Calyx 5-partite; segments narrow, faintly imbricate. *Corolla* 2-lipped; upper lip outmost, erect, concave, 2-fid; lower larger, spreading, 3-lobed; tube cylindric. *Stamens* 2; upper pair alone perfect, sub-included; anthers contiguous, the cells divaricate; lower pair represented by 2 obtuse, glandular, entire staminodes on corolla-throat. *Ovary* 2-celled; ovules in each cell numerous; style slender; stigma 2-lamellate. *Fruit* a narrow, exserted, septicidal capsule; valves separating from the placentiferous septum. *Seeds* many, small, rugose. —DISTRIB. Species about 10, in tropics of Eastern Hemisphere.

Leaves sharply, closely, deeply serrate:—

Leaves sessile; flowers white or pink; stems green .. 1. *B. brachiata*.

Leaves petioled; flowers purple; stems reddish .. 2. *B. reptans*.

Leaves remotely, shallowly serrate, or sub-entire; flowers violet-purple:—

Leaves narrow-oblong 3. *B. veronicaefolia*.

Leaves lanceolate { 3b. *veronicaefolia*,
var. *verbenæfolia*.

1. BONNAYA BRACHIATA, Link & Otto, Ic. Pl. Sel. I. 25, t. 11. An erect rather rigid herb, 4 to 10 in. high; branches diffuse divaricate, the lowest decumbent below. *Leaves* oblong, obtuse or acute, margins thickened and sharply closely deeply serrate with teeth mucronate; lamina .5 to 1.5 in. long; pedicels rigid about .25 in long; bracts small. *Calyx* of 5 nearly free sepals .25 in. long. *Corolla* white or pink, .25 in. long. *Capsule* slender, spreading or erect, .5 to .6 in. long. Benth. in Wall. Cat. 3855, Scroph. Ind. 32, and DC. Prod. X. 420; Miq. Flor. Ind. Bat. II. 695; Hook. f. Flor. Brit. Ind. IV. 284. *B. serrata*, Griff. Notul. IV. 108. *B. pusilla*, Benth. Scroph. Ind. 33; Wall. Cat. 3861. *Gratiola serrata*, Roxb. Flor. Ind. I. 139, and ed. Carey & Wall. I. 140. Rheede, Hort. Malab. IX. t. 59.

SINGAPORE: Wallich! PAHANG: Ridley!—DISTRIB. India, Indo-China, China, Malaya, Philippines.

Wallich's Singapore specimen and one of Ridley's from Pahang belong to the form distinguished by Bentham as *B. pusilla*; another Pahang gathering (Ridley 2163) consists of genuine *B. brachiata*, from which, however, *B. pusilla*, though separable as a marked form, is hardly separable as a variety.

2. BONNAYA REPTANS, Spreng. Syst. I. 41. A prostrate creeping slender herb with reddish stem, branches and leaves beneath; branches diffuse spreading often 12 in. long. *Leaves* in distant pairs, obovate-oblong, obtuse, margins thickened and sharply serrate with mucronate teeth; base narrow-cuneate passing into a petiole .25 in. long; blade .75 to 1.25 in. long, .5 in. wide. *Flowers* opposite in terminal racemes sometimes 3 to 4 in. long; pedicels rigid, .25 in. long; bracts small.

Calyx of 5 nearly equal sepals, .3 in. long. *Corolla* purple, .75 in. long. *Capsule* very slender, spreading, 1 in. long. Benth. in DC. Prod. X. 420; Wall. Cat. 3856; Hook. f. Flor. Brit. Ind. IV. 284. *B. ruelloides*, Spreng. Syst. I. 41. *B. ciliata*, Spreng. Syst. I. 41. *Gratiola ciliata*, Koenig in Vahl Symb. I. 97. *G. ruelloides*, Koenig in Vahl Symb. I. 99. *G. reptans*, Roxb. Flor. Ind. I. 140. *Henckelia Roxburghiana*, Dietr. Sp. Pl. I. 572.

PENANG: *Curtis*! PERAK: *Scortechini*! WRAY! PROVINCE WELLESLEY: *Ridley* 6985! PAHANG: *Ridley*! SINGAPORE: *Hullett*! *Ridley*!—DISTRIB. E. Himalaya, India, Indo-China, Malaya, Philippines.

3. BONNAYA VERONICÆFOLIA, Spreng. Syst. I. 41. A flaccid decumbent or creeping herb, with ascending branches 4 to 8 in. long. *Leaves* sub-sessile or narrowed into a short petiole, oblong or oblong-lanceolate or obovate, or lanceolate, obtuse or acute, margin distantly serrate or sub-serrate or sub-entire. *Flowers* opposite, in terminal leafy or naked racemes sometimes up to 6 in. long usually much shorter, pedicels rather flaccid, .25 in. to .35 in. long; bracts leafy or small. *Calyx* of 5 nearly equal sepals .2 in. long. *Corolla* violet-purple, .25 to .35 in. long. *Capsule* slender, sub-erect or spreading, .5 to .6 in. long.

VAR. *typica*. *Leaves* usually obtuse, sometimes acute, always distantly serrate, 1 to 2 in. long, .5 in. wide; racemes usually with leafy bracts; *corolla* .25 in. long. *B. veronicæfolia*, Wall. Cat. 3857; Benth. in DC. Prod. X. 421; Wight Ic. t. 1411; Miq. Flor. Ind. Bat. II. 696; Hook. f. Flor. Brit. Ind. IV. 285. *B. marginata*, Spreng. Syst. I. 41. *B. rigida*, Benth. in Wall. Cat. 3859. *B. procumbens*, Benth. in Wall. Cat. 3860. *B. Rothii*, Dietr. Sp. Pl. I. 556. *B. bracteata*, Griff. Notul. IV. 107. *Gratiola veronicæfolia*, Retz Obs. IV. 8; Roxb. Pl. Corom. II. 30, t. 154; Fl. Ind. I. 138; ed. Carey & Wall. I. 139. *G. marginata*, Colsm. in Vahl Enum. I. 98. *G. racemosa*, Roth Nov. Sp. 9.

PENANG: Balli Pulo, George Town, &c. *Deschamps*! SINGAPORE: *King's Collector*! PAHANG: *Ridley*! MALACCA: *Hervey*! SELANGOR: *Ridley*! JOHORE: Serom, *Ridley*!—DISTRIB. Throughout S.E. Asia.

VAR. *verbenæfolia*, Hook. f. Flor. Brit. Ind. IV. 285. *Leaves* acute or sub-acute, distantly shallowly serrate or sub-entire, 1 to 1.5 in. long, .2 to .25 in. wide; racemes usually marked with minute bracts; *corolla* .35 in. long. *B. verbenæfolia*, Benth. in DC. Prod. X. 421; Wall. Cat. 3858; Wight, Ic. t. 1412. *B. Roxburghiana*, Dietr. Sp. Pl. I. 559. *B. eyanea*, Griff. Notul. IV. 107. *Gratiola verbenæfolia*, Colsm. in Vahl Enum. I. 96. *G. ciliata*, Colsm. in Vahl Enum. I. 97. *G. racemosa*, Roxb. Fl. Ind. I. 138, and ed. Carey & Wall. I. 139. *G.*

Roxburghiana, Roem. & Schult. Syst. I. 123. *Tittmannia Colsmanni*, Benth. in Wall. Cat. 3950. *Torenia gracilis*, Benth. in Wall. Cat. 3952.

MALACCA: *Hervey*! PENANG: *Curtis*! PERAK: *Ridley*! *Scortechini*!—DISTRIB. Throughout S.E. Asia.

11. SCOPARIA, Linn.

Undershrubs or herbs with twiggy branches. *Leaves* opposite or whorled, glabrous or pubescent, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or 2-nate; bracteoles 0. *Calyx* small, 4-5-partite; lobes imbricate. *Corolla* small, rotate, 4-lobed; lobes imbricate, sub-equal, obtuse; throat densely bearded; tube very short. *Stamens* 4, sub-equal; filaments filiform; anthers sub-sagittate, cells diverging or parallel, discrete. *Ovary* 2-celled; ovules in each cell numerous; style sub-clavate; stigma truncate or emarginate. *Fruit* a small, ovoid or globose, septicidal capsule; valves membranous, with inflexed margins, separating from the placentiferous septum. *Seeds* many, small, obovoid, angular, scrobiculate.—DISTRIB. Species about 6, all American.

SCOPARIA DULCIS, Linn. Sp. Pl. 116. A glabrous much-branched erect or ascending leafy undershrub with a strong perennial woody rootstock; stems 6 in. to 3 ft. high. *Leaves* opposite or ternate, lanceolate or elliptic-lanceolate, 1 to 2 in. long, .5 to 1.5 in. wide, serrate, acute or obtuse, narrowed to a short petiole. *Flowers* many minute in terminal panicles; pedicles slender, strict, .25 to .4 in. long. *Sepals* 4, oblong. *Corolla* white, .12 in. in diam., tube very short. *Stamens* sub-equal. *Capsule* globose, .15 in. in diam. Voigt Hort. Suburb. Calcutt. 507; Benth. in DC. Prod. X. 431; Gaertn. Fruct. I. 251, t. 53, f. 10; Miq. Flor. Ind. Bat. II. 699; Hook. f. Flor. Brit. Ind. IV. 289.

PENANG: *Kampai*, Batu Gaja, &c., *King*! *Deshamps*! *Curtis*! SELANGOR: *Ridley*! PERAK: *Scortechini*! SINGAPORE: *Hullett*! *Kurz*! *King's Collector*! *Deshamps*!—DISTRIB. Everywhere in the tropics; originally American.

12. STRIGA, Lour.

Herbs, semiparasitic on roots, usually scabrid, discoloured when dry. *Leaves* opposite below, alternate above, linear, entire or rarely toothed sometimes reduced to scales. *Flowers* axillary, or the upper in bracteate spikes; bracteoles usually 2. *Calyx* 5-toothed or 5-fid, 5- or 10- or 15-ribbed, tubular. *Corolla* 2-lipped; upper lip inner in bud,

usually shortly 2-fid or emarginate, lower 3-lobed; limb spreading; tube slender abruptly incurved at or above the middle. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse; connective sometimes mucronate. *Ovary* 2-celled; ovules in each cell numerous; style thickened upwards; stigma entire. *Fruit* an oblong or globose loculicidal capsule; valves entire, firm, septiferous, separating from the placentas. *Seeds* many, small, ovoid or oblong, reticulated.—**DISTRIB.** Species 20, in the tropics of the Eastern Hemisphere.

STRIGA LUTEA, Lour. Flor. Cochin-Chin. 22. A slender, erect, simple or fastigiately branched herb, 6 to 18 in. high; leaves and stems scabrid or villous. *Leaves* linear, .5 to 1.5 in. long, .12 in. wide. *Flowers* in elongated, usually interrupted spikes, 2 to 6 in. long; bracts usually exceeding the calyx, linear-lanceolate, scabrid. *Calyx* 10-ribbed, .25 in. long, teeth 5, sub-equal. *Corolla* white or yellow or pink or purple, .5 in. long, glabrous, incurved; upper lip emarginate reflexed; lower lip 3-lobed spreading. *Capsule* oblong, grooved, shorter than the calyx. Benth. in Hook. Comp. Bot. Mag. I. 363; Hook. f. Flor. Brit. Ind. IV. 299. *S. hirsuta*, Benth. in DC. Prod. X. 502; Dalz. & Gibs. Bomb. Flor. 181. *S. eoccinea*, Benth. in DC. Prod. X. 364. *S. phanieea*, Benth. in DC. Prod. X. 364. *Buehnera asiatica*, Linn. Sp. Pl. 630 partly; Roxb. Fl. Ind. III. 31; Benth. Scroph. Ind. 40. *B. eoccinea*, Benth. Scroph. Ind. 40, Wall. Cat. 3870. *B. phanieea*, Benth. Scroph. Ind. 40; Wall. Cat. 3874. *Campuleia eoccinea*, Hook. Flor. Exot. t. 203. Rheede Hort. Malab. IX. t. 66.

PENANG: Curtis 1840! **PAHANG:** Ridley! **SINGAPORE:** Ridley 139; Kurz! **ANDAMANS:** Port Blair, King! **Prain!**—**DISTRIB.** Throughout S.E. Asia, Arabia, Madagascar, Africa.

13. CENTRANTHERA, R. Br.

Herbs, semiparasitic, annual, rigid, scabrous. *Leaves* opposite throughout, or opposite below alternate above, oblong or linear, obtuse, entire or toothed. *Flowers* axillary, or in bracteate spikes or racemes; bracteoles 2. *Calyx* compressed, spathaceous, split on one side, acuminate entire, or shortly 3-5-lobed on the other. *Corolla* 5-lobed; lobes sub-equal, spreading, the 2 upper inmost in bud; limb oblique; tube long, incurved. *Stamens* 4, didynamous, included; anthers contiguous in pairs; cells transverse, spurred or mucronate at base, one cell often sterile. *Ovary* 2-celled; ovules in each cell numerous; style simple, dilated above; stigma acute, linguiform. *Fruit* an ovoid or sub-globose loculicidal capsule; valves entire, carrying away the

placentas. *Seeds* many, small, oblong-cuneate; testa lax, reticulate.—
DISTRIB. Species 4–5, E. Asiatic and Australian.

CENTRANTHERA HUMIFUSA, Wall. Cat. 3883. A dwarf herb, diffusely branching from the base, hispid or glabrous, branches 3 to 6 in. long. *Leaves* linear, entire, .5 to .75 in. long. *Flowers* in terminal spikes, sub-sessile; bracts small. *Calyx* ovoid, sub-acute, .15 in. long. *Corolla* yellow, .3 to .5 in. long, incurved. *Capsule* sub-globose, .15 in. wide. Benth. in DC. Prod. X. 525; Hook. f. Flor. Brit. Ind. IV. 301. *Razumovia tranquebarica*, Spreng. Syst. II. 812. *Torenia lepidota*, Roth Nov. Sp. 281.

MALACCA: *Griffith*! SINGAPORE: *Kurz*!—DISTRIB. China, Indo-China, India, Malaya.

Order LXXXIV. OROBANCHACEÆ.

[By D. PRAIN.]

Root-parasites, annual, white or reddish. *Stem* simple or branched, stout or slender, clothed with leaf-scales. *Leaves* proper 0. *Flowers* solitary or in spikes or racemes, irregular. *Sepals* 4–5, usually connate in a variously toothed or spathaceous calyx, rarely free. *Corolla* hypogynous, 2-lipped; upper lip vaulted, lower lip 3-lobed; throat often with 2 villous folds; tube curved. *Stamens* 4, didynamous, inserted on corolla-tube; anthers 1–2-celled; cells spurred at the base, dehiscence by slits or basal pores; one cell sometimes imperfect. *Disk* unilateral or glandular or obsolete. *Ovary* of 2 connate carpels, usually 1-celled; style long, tip curved; stigma 2-lobed, sub-capitate; ovules usually numerous on generally 2 pairs of free or confluent parietal placentas which sometimes meet in the axis of the ovary. *Capsule* 1-celled, 2-valved; *seeds* usually many, minute, with a pitted or tubercled, rarely reticulate and lax testa; albumen fleshy; embryo ovoid, entire or 2-fid.

ÆGINETIA, Linn.

Leafless parasitic herbs with simple or branched naked or scaly stems or scapes. *Flowers* few, large, solitary or corymbose; bracteoles 0. *Calyx* spathaceous, split in front almost to the base. *Corolla* incurved, campanulate-tubular; limb obscurely 2-lipped, lobes somewhat spreading, the two upper lobes (upper-lip) connate. *Stamens* included; anthers with one perfect cell adnate to filament and not spurred; the other cell absent in upper anthers, empty clavate and deflexed in the lower. *Ovary* 1-celled; placentas large, 2-lobed or multifid, filling the chamber, ovuliferous throughout; style slender;

stigma large peltate. *Capsule* partially 2-valved. *Seeds* many, small, crowded; testa pitted.—DISTRIB. Species 3, S.E. Asiatic.

ÆGINETIA PEDUNCULATA, Wall. Pl. As. Rar. III. 13, t. 219. A leafless herb, 3 to 6 in. high; stems red or yellow, parasitic on roots, buried, emitting several short stout fleshy several-flowered scapes with alternate peduncled flowers; peduncles 1 to 4 in. long, stout, bracteate at base; bracts .25 to .35 in., ovate, obtuse. *Calyx* 1.5 to 2 in. long, fleshy, dull-pink at length yellowish-white, with a mucilaginous pad surrounding base of corolla, tip acute or obtuse. *Corolla-tube* yellow or white, the lobes violet or claret-coloured, crenate and erose. *Stamens* didynamous, anthers of lower pair with a large dorsal fleshy decurved horn. *Ovary* 1-celled, placentas 2, each of 2 plates; stigma cordate-peltate. *Capsule* ovoid. *Seeds* brown. Reut. in DC. Prod. XI. 43; Wight Ill. t. 158B, f. 6; Ic. t. 1421; Hook. f. Flor. Brit. Ind. IV. 320. *Æ. abbreviata*, Ham. in Wall. Cat. 3965; Benth. Scroph. Ind. 95; Reut. in DC. Prod. XI. 43. *Æ. acaulis*, Walp. Rep. III. 481; Reut. in DC. Prod. XI. 43. *Orobanche pedunculata*, Roxb. Hort. Beng. 45; Fl. Ind. iii. 29. *O. acaulis*, Roxb. Cor. Pl. III. 89, t. 292, and Fl. Ind. III. 29.

PERAK: Batang Padang Valley, 2,000 feet; Wray 1456! 1457!—DISTRIB. India, Indo-China, Java, Sumatra.

One of Wray's specimens is attached to the rhizome of a *Kempferia*.

CHRISTISONIA, Gardn.

Low fleshy scaly parasitic herbs, with yellow or white or rose-purple flowers; stems simple or tufted from a short or long rootstock; scales alternate, obtuse or acute. *Flowers* densely or laxly corymbose; bracteoles 2 or 0. *Calyx* tubular, terete or angular, 2-5-lobed or -toothed. *Corolla-tube* long, inflated or funnel-shaped, slightly or distinctly curved, 5-lobed, obscurely to distinctly 2-lipped, the two upper lobes (in our species outer in bud) sub-erect, the lower spreading. *Stamens* 4, included or sub-exserted; filaments stout; anthers with one perfect cell and one imperfect, one pair sometimes spurred or appendaged; rarely with both cells perfect. *Disk* 0. *Ovary* 1-celled with two 2-partite placentas, or 2-celled from the placentas meeting in the axis; style long, tip incurved, stigma large, 2-lobed, the upper lobe very small or obsolete, the lower (sometimes the only one present) very large orbicular or clavate; ovules numerous. *Capsule* ovoid or sub-globose, loculicidal. *Seeds* minute, crowded, many perfect with striate testa, others imperfect with lax testa; embryo half as long as the albumen.—DISTRIB. Species 12, tropical Asiatic.

CHRISTISONIA SCORTECHINII, Prain in Journ. As. Soc. Beng. LXXIII. 2. 205. *Stem* short hypogæal, covered with linear scales. *Flowers* 3 to 8, crowded in a dense corymb; some shortly peduncled, others sessile, each with an oblong cucullate basal bract .75 in. long; all parts loaded with sticky mucilage. *Calyx* spathaceous, rupturing into usually 2 (sometimes, *vide* Scortechini, into 2 to 4) lobes, in the fully opened flower with tube 1 in., lobes .25 in. long. *Corolla-tube* white, with a yellow line inside in front, 2 in. long, infundibuliform and curved above, the lower part narrow-cylindric 1 in. long; limb 2-labiate, upper lip outmost in bud, erect, 2-lobed, lower lip 3-lobed, spreading. *Stamens* didynamous; anthers all conniving; filaments glabrous, inserted below middle of corolla-tube, 1-celled, adnate to the enlarged filament, upper pair without, lower with an empty oblong pointed cell. *Disk* 0. *Ovary* glabrous, 1-celled, placentas 2, 2-fid, uniformly covered with ovules; style glabrous downwards; stigma peltate, flat, .2 in. in diam.

PERAK: *Scortechini*, 2121!

Order LXXXV. LENTIBULARIACEÆ.

[By D. PRAIN.]

Marsh or aquatic herbs, or occasionally growing on wet rocks. *Leaves* radical, rosulate or when submerged capillary-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, on 1-many-flowered simple or branched scapes; bracts small, sometimes 0; bracteoles under calyx 2 or 0. *Calyx* inferior, 2-5-lobed. *Corolla* 2-lipped and spurred; upper lip usually the smaller, entire or emarginate; lower lip 3-6-lobed. *Stamens* 2, adnate to the base of the corolla, alternate with the lobes of the lower lip; filaments widely curving, anther-cells ovate, transversely confluent; dehiscence longitudinal. *Carpels* 2, connate in a superior, globose, 1-celled ovary; ovules very many, on a free basal placenta; style short; stigma unequally 2-lobed. *Fruit* a globose 2-4-valved, or irregularly rupturing capsule. *Seeds* very many, minute; albumen 0.—DISTRIB. Species nearly 200, in all parts of the world.

UTRICULARIA, Linn.

Herbs, often very small, submerged or floating, or growing on wet rocks. *Leaves* in submerged or floating species multifid, with capillary segments, in erect or twining species entire, often disappearing at time of flowering, frequently with minute bladders. *Flowers* on simple or branched scapes, racemes few- or many-flowered; bracts and 2 bracteoles

distinct. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped; upper lip entire or emarginate; lower larger 3-6-lobed; tube with a straight or curved spur. *Stamens* 2, adnate to base of corolla, alternate with lobes of lower lip; filaments broad; anthers ovate, 2-celled, or by confluence almost 1-celled. *Carpels* connate in a globose 1-celled ovary; ovules many, on a central placenta; style short; stigma unequally 2-lobed. *Capsule* globose, regularly 2-4-valved, or opening irregularly. *Seeds* many, small; albumen 0.—**DISTRIB.** Species 150, in most countries.

Leaves many, submerged, scattered, divided into numerous capillary segments mostly interspersed with bladders; calyx-lobes equal or nearly so; pedicels not winged:—

Flowers yellow to pale-yellow or nearly white:—

Peduncles very slender; flowers usually two, never more than three, always under .25 in. across; pedicels in fruit erect: sometimes the capillary leaves absent 1. *U. exoleta*.

Peduncles stout; flowers usually more than three, and always from .35 to .5 in. across; pedicels reflexed in fruit and thickened under the calyx 2. *U. flexuosa*.

Flowers blue or red or pink; pedicels erect in fruit .. 3. *U. punctata*.
Leaves few, rosulate at base of stem:—

Leaves linear or linear-spathulate, usually absent at time of flowering; calyx-lobes equal or nearly so; seeds not glochidiate:—

Scales of the scape and bracts attached by their bases:—

Stems erect:—

Flowers yellow; pedicels in fruit distinctly winged .. 4. *U. bifida*.

Flowers pink, purple, or violet, rarely white with lilac markings:—

Pedicels in fruit slightly winged; sometimes a few leaves still present at time of flowering; stems 8 to 12 in. high, stoutish 5. *U. affinis*
VAR. *Griffithii*.

Pedicels in fruit capillary, short, wingless; leaves 0 at time of flowering; stems 2 to 3 in. high, very slender 6. *U. minutissima*.

Stems twining; flowers yellow:—

Stems slender, leaves absent at time of flowering; lower lip less than .25 in. wide 7. *U. Wallichiana*.

Stems stouter; leaves forming matted masses; lower lip over .3 in. wide 8. *U. involvens*.

Scales of the scape and bracts produced downward below point of attachment:—

Flowers on distinct pedicels as long as the fruiting calyx or longer; capsule longer than fruiting calyx-lobes; flowers pink (*Ridley*) 9. *U. verticillata*.

Flowers almost or quite sessile; capsule hidden by the fruiting calyx-lobes:—

Flowers few, scattered on the very slender scapes; corolla white 10. *U. racemosa*
VAR. *filicaulis*.

Flowers many or few, congested at the ends of the
stouter rigid scapes and branches; corolla rarely pure
white

.. 11. *U. ophirensis*.

Leaves orbicular or spatulate-orbicular, persistent; calyx-lobes
very unequal, the upper the larger; seeds glochidiate; stems
very slender, lip pale-violet or white with a yellow centre .. 12. *U. orbiculata*.

1. *UTRICULARIA EXOLETA*, R. Br. Prod. 430. A water-weed, sometimes floating with very slender stems and submerged divided capillary leaves, the segments interspersed with bladders; sometimes growing in mud with capillary leaves absent and with tufted setaceous leaves. *Scapes* slender, naked, or with one or two scale-like bracts, 2 to 4 in. long, usually 2-flowered, occasionally 3-flowered, sometimes 1-flowered, then often with an abortive axis or flower-bud opposite the bract; pedicels slender, erect, the lowest ultimately 4 in. long; bracts very small, obtuse, basifixed; bracteoles 0. *Calyx* 2-lobed; lobes slightly unequal, ovate-obtuse or sub-orbicular, in fruit adpressed to the capsule, 1 in. long. *Corolla* yellow, 2 in. across; spur cylindric-conical, twice as long as lower calyx-lobe and slightly exceeding lower lip of corolla, which has an entire margin and embraces the base of the spur. *Capsule* almost globose, 15 in. in diam. *Seeds* sub-trapezoid-discoid, margin thin, spreading, minutely crenulate. A. DC. Prod. VIII. 7; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. diantha*, Roem. & Schult. Syst. Veg. I. 169; Wight Ic. t. 1569; Oliv. Journ. Linn. Soc. III. 175. *U. diflora*, Roxb. Hort. Beng. 4. *U. biflora*, Roxb. Fl. Ind. I. 143, nec alior. *U. Roxburghii*, Spreng. Syst. I. 52. *U. elegans*, Wall. Cat. 1502. *U. pterosperma*, Edgew. Proc. Linn. Soc. I. 352.

PERAK: Sunga Ryah, *King's Collector* 891! 4383! *Ridley*! SINGAPORE: *Ridley*. PROV. WELLESLEY: *Ridley*! JOHORE: Parit Lombong, *Ridley*! PAHANG: Kwala Pahang, *Ridley*! NICOBARS: Kamorta, *Kurz*! —DISTRIB. S.E. Asia, N. Australia.

2. *UTRICULARIA FLEXUOSA*, Vahl Enum. I. 198. A floating water-weed with submerged divided capillary leaves, the segments interspersed with bladders; occasionally with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, scattered or sometimes whorled near or occasionally above the base of the scapes. *Scapes* 3 to 10 in. long, 3-12-flowered; pedicels stout, reflexed, and slightly thickened under the calyx in fruit, ultimately 3 to 5 in. long; bracts ovate-acute, basifixed; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-sub-acute, in fruit patent, 25 in. long. *Corolla* yellow, rarely white, 3 to 5 in. across; spur somewhat longer than lower calyx-lobe, and about as long as lower lip of corolla, stoutish, bluntish, straight or somewhat curved. *Capsule* compressed, sub-globose, 25 in.

long. *Seeds* thickly discoid, margin thin, incurved towards the concave face, usually 5-6-angled. Bl. Bijdr. 739; A. DC. Prod. VIII. 24; Oliv. Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10. *U. australis*, R. Br. Prod. 430; A. DC. Prod. VIII. 6. *U. fasciculata*, Roxb. Fl. Ind. I. 143; Wall. Cat. 1499; A. DC. Prod. VIII. 7; Wight Ic. t. 1568; Miq. Flor. Ind. Bat. Suppl. 246. *U. confervifolia*, Don Prod. 84; A. DC. Prod. VIII. 8. *U. inæqualis*, Benj. Linnæa XX. 304. *U. Blumei*, Miq. Fl. Ind. Bat. II. 994. *U. extensa*, Hance in Walp. Ann. III. 3.

MALACCA: *Ridley*! PAHANG: Kwala Pahang, *Ridley*! PERAK: *Scortechini*! DURIAN S. Batang, *King's Collector* 1036! SINGAPORE: *Ridley* 5642, 9844! KEDAH: Langkawi, *Curtis*!—DISTRIB. S.E. Asia, N. Australia.

Forma gracilis, Oliv. Journ. Linn. Soc. III. 175 (= *U. inæqualis*, Benj.) more slender in all its parts and with smaller paler yellow flowers.

SINGAPORE: *King's Collector* 1165! *Hullett* 36! 385! MALACCA: *Cuming*! *Goodenough* 1407! *Ridley*! PROV. WELLESLEY: *Ridley*!

The very similar and nearly allied *U. stellaris*, distinguished most easily by the presence of a cluster of oblong vesicles about the middle of the peduncle, has not been reported so far from the Malayan Peninsula.

King's Collector's field-note on the slender form, which the writer agrees with Oliver in considering no more than a form of *U. flexuosa*, is as follows: "Herbaceous plant, in clear pools of fresh water; colour bright green. Flowers pale yellow. I sent a similar one from Durian S. Batang, but I don't think the same." His field-note on genuine *U. flexuosa* is as follows: "Growing in muddy pools of water; colour a dark reddish-brown, tinged with green; flower bright yellow."

In his interesting paper on the *Utricularias* of the Malay Peninsula (*Journ. Bot.* for 1895, pp. 10, 11) Mr. Ridley gives as localities for *U. flexuosa* Pahang and Kedah, Langkawi, but does not differentiate the two forms. The leaves, he remarks, are used in medicine by the Malays, who call it Lumut Ekor Kuching (Cat's Tail Moss) or Lumut Ekor Kuning (Yellow Tail Moss).

3. *UTRICULARIA PUNCTATA*, Wall. Cat. 2121. A floating water-weed, with submerged divided capillary leaves, the segments interspersed with bladders, often with narrow, oblong, floating vesicles 1 to 3 in. long, beset with capillary leaves, near the base of the scapes. *Scapes* 4 to 12 in., usually many-flowered; pedicels slender, ascending or sub-erect in fruit, ultimately .5 to .6 in. long; bracts ovate, more or less acute, slightly produced beyond base; bracteoles 0. *Calyx* 2-lobed, lobes sub-equal, ovate-rotund, obtuse, .1 in. long. *Corolla* blue, reddish-purple or pink, .25 in. across, spur somewhat longer than lower calyx-lobe, shorter than lower lip of corolla, thick, sub-cylindric, obtuse. *Capsule* thin, ovate-oblong, obtuse, .2 in. long. *Seeds* discoid, peltate,

margin winged throughout, wing deeply, sharply toothed. A. DC. Prod. VIII. 5; Wight Ic. t. 1570; Oliv. in Journ. Linn. Soc. III. 175; Hook. f. Flor. Brit. Ind. IV. 329; Ridl. Journ. Bot. XXXIII. 10.

PAHANG: Chenei Lake, *Fox*!—DISTRIB. Borneo, Tenasserim.

4. *UTRICULARIA BIFIDA*, Linn. Sp. Pl. 26. A slender erect weed of wet places; leaves radical, linear-spathulate, disappearing before flowering, .3 to .5 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 2 to 10 in. long, 2-many-flowered, beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, in flower .12 in., in fruit .2 in. long, recurved and distinctly winged from the decurrent calyx, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate-obtuse, .25 in. long. *Corolla* yellow, .25 in. wide; spur longer than the lower calyx-lobe and as long as the lower lip of the corolla, slightly falcate. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, testa lax, serobiculate, obliquely striate. A. DC. Prod. VIII. 21; Oliv. Journ. Linn. Soc. III. 182; Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 10. *U. biflora*, Wall. Cat. 1498 (*not of* Roxb.). *U. diantha*, A. DC. Prod. VIII. 21 (*not of* Roem. & Schult.). *U. Wallichiana*, Benj. Bot. Zeit. 1845 214 (*not of* Wight). *U. brevicaulis*, Benj. Linnæa XX. 303.

PENANG: *Curtis*! SELANGOR: *Ridley*! PERAK: Larut, *Scortechini*! Selama, growing among grass in swampy places, *Wray* 4263! *Ridley*! PROV. WELLESLEY: in wet and swampy places, *King's Collector* 1616! SINGAPORE: in wet, sandy hollows, *Kurz* 2973! *Ridley*! MALACCA: *Griffith*! *Hervey*! *Ridley*! PAHANG: Kwala Pahang, *Ridley* 1481! KEDAH: *Curtis*.—DISTRIB. Throughout E. and S.E. Asia.

Mr. Ridley has seen specimens of this species from the Dindings and from Penang, also from Kedah, Langkawi. He finds two rather distinct forms, a small-flowered, plain yellow one and a form with larger flowers over .25 in. long with a darker orange centre; this latter Ridley found in Pahang growing with the common form.

5. *UTRICULARIA AFFINIS*, Wight; var. *Griffithii*, Oliv. Journ. Linn. Soc. III. 179. A slender erect weed of wet places. *Leaves* radical, linear or linear-spathulate, obtuse, very often persisting during flowering, .5 to .7 in. long; roots fibrous, sometimes with a few bladders. *Scapes* 5 to 12 in. long, usually many-flowered; beset with a few basifixed ovate-acute scales or empty bracts; pedicels short, .1 in. long in flower, in fruit .15 in. long and slightly winged by the decurrent calyx, erect or ascending, never recurved and rarely patent, with ovate-acute basal bracts. *Calyx* 2-lobed; lobes sub-equal, ovate or sub-orbicular, acute or sub-cuspidate, .25 in. long. *Corolla* blue with whitish lines, .25 in. wide; spur slightly longer than the lower calyx-

lobe and the lower lip of the corolla. *Capsule* ovate, .2 in. long, hidden by the calyx. *Seeds* obovoid, reticulate, cells of the testa sub-hexagonal. *U. Griffithii*, Wight Ic. t. 1576; Ridl. Journ. Bot. XXXIII. 10. *U. caerulea*, Benth. Fl. Hongk. 256 (not of Linn.).

MALACCA: *Griffith!* RIDLEY: *Seortechini!* SINGAPORE: *Hullett!* RIDLEY!—DISTRIB. China, Burma, Tenasserim, Borneo.

There are only shrivelled leaves on Ridley's and Wight's specimens, which are mostly in fruit; Scortechini's specimens, which are in flower, have numerous radical grassy linear-spathulate obtuse leaves, .5 in. long or rather longer. Mr. Ridley, in all probability rightly, considers that this is entitled to specific rank apart from *U. affinis*.

6. *UTRICULARIA MINUTISSIMA*, Vahl Enum. I. 204. A very small erect weed of wet places; leaves 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* capillary, rigid, branched, 2 to 3 in. long, quite glabrous, or with a few rigid scattered black hairs; racemes 2-5-flowered, beset with a few basifixed ovate-acute empty bracts or scales; pedicels very short, in fruit only .05 in. long, occasionally like the upper calyx-lobe with a few straight black hairs, sub-patent, with small lanceolate basifixed bracts and bracteoles, less than half as long as their pedicels. *Calyx* 2-lobed, lobes sub-equal wide-oblong, obtuse, in fruit .1 in. long. *Corolla* mauve, .15 in. wide; spur wide-conic-cylindric, thrice as long as lower calyx-lobe and twice as long as lower lip of corolla. *Capsule* oblong, .07 in. long, covered by the calyx. *Seeds* minute, ovoid, obscurely scrobiculate. A. DC. Prod. VIII. 16; Oliv. Journ. Linn. Soc. III. 190; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11.

PERAK: Larut, *Seortechini* 1501! PAHANG: Kwala Pahang, *Ridley* 1474c in part! MALACCA: *Koenig*; on Mount Ophir, *Ridley*.

This small plant, collected by Scortechini with no note of colour, and stated by Ridley to have mauve flowers, is here identified with *U. minutissima*, Vahl, from description only. The branched capillary stems render it very like and very liable to be mistaken for small specimens of *U. verticillata*, which has, however, longer pedicels and bracts produced below their point of insertion. The presence of hairs on the stems, pedicels, and sometimes the calyx, at once suggests a reference to *U. hirta*, which is undoubtedly its nearest affinity. The scape, however, appears never to branch in *U. hirta*; the flowers in that species are larger and fewer; the pubescence, too, when present in *U. minutissima*, which is not always the case, is very different, consisting of rigid patent black bristly hairs, whereas in *U. hirta* the hairs are soft and grey or tawny. The seeds of the two species are very similar, but those of *U. minutissima* are smaller and yet have fewer- and larger-meshed sub-hexagonal reticulations.

7. *UTRICULARIA WALLICHIANA*, Wight Ic. t. 1572, fig. 1. A very slender herb growing in wettish fields and damp grassy places; stems

twining, thin, 6 to 8 in. long. *Leaves* linear-spathulate, absent at time of flowering; bladders not seen. *Flowers* small, racemose or subspicate at ends of stems; pedicels sometimes absent, sometimes up to .25 in. long; bracts lanceolate, acute, basifixed. *Calyx-lobes* ovate, acute, .15 in. long, in fruit .2 in. long. *Corolla* yellow; upper lip obovate, lower rounded, .2 in. wide; spur straight or slightly incurved, .2 in. long. *Capsule* sub-globose, enclosed within calyx-lobes, upraised on the sub-erect fruiting pedicels. *Seeds* ellipsoid, scrobiculate but not glochidiate or papillose. Oliv. in Journ. Linn. Soc. III. 182; Clarke in Hook. f. Flor. Brit. Ind. IV. 332; Ridl. Journ. Bot. XXXIII. 11. *U. scandens*, Benj. in Linnæa XX. 309 chiefly. *U. macrolepis*, Wight Ic. t. 1580, fig. 2. *U. capillacea*, Thw. Enum. 171 (not of Oliv.).

MALACCA: Mount Ophir, at 4,000 feet elevation, growing among grasses, *Ridley*!—DISTRIB. Throughout India.

8. *UTRICULARIA INVOLVENS*, Ridl. Journ. Bot. XXXIII. 11. A tufted herb forming mats of leaves on rocks in streams; stems twining, fairly stout, 12 in. long. *Leaves* thinly membranous, spathulate-linear, obtuse, 1 in. long or longer, .1 in. across. *Flowers* large, racemed at ends of stems; pedicels .5 to .75 in. long; bracts lanceolate, acute, basifixed, .1 in. long. *Calyx-lobes* oblong-ovate, .25 in. long. *Corolla* lemon-yellow; upper lip obovate, lower rounded, 2-lobed, .35 in. wide; spur straight, pendulous, acute or acuminate, .25 in. long. *Capsule* unknown.

KEDAH: Kedah Peak (Gunong Jerai), at 3,000 feet elevation, in streams and wet places, *Ridley*!

A very fine and remarkably distinct species.

9. *UTRICULARIA VERTICILLATA*, Benj. Linnæa XX. 312. A slender erect weed of wet places. *Leaves* 0 at time of flowering and not seen; roots fibrous, bladders not seen. *Scapes* slender, sometimes capillary, rigid, branched, 3 to 10 in. long, glabrous; beset with a few ovate scales or empty bracts, acute at both ends and produced downwards beyond point of insertion; pedicels capillary, puberulous, .2 in. long in flower, in fruit .25 in. long; bracts and bracteoles produced below point of insertion. *Calyx* 2-lobed, lobes sub-equal, sub-orbicular, in fruit .1 in. long. *Corolla* (? yellow) .15 in. wide; spur wide-cylindric, slightly exceeding lower lip of corolla. *Capsule* globose, .15 in. in diam., projecting beyond the closely adpressed calyx-lobes. *Seeds* minute, with sub-hexagonal reticulations. Oliv. Journ. Linn. Soc. III. 184; Hook. f. Flor. Brit. Ind. IV. 333; Ridl. Journ. Bot. XXXIII. 10. *U. bifida*, Wight Ic. t. 1584, f. 2 (not of Linn.).

KEDAH : Langkawi, *Curtis* ! MALACCA : *Griffith* ! PAHANG : Kwala Pahang, *Ridley* 1481 in part !

Oliver has suggested that the colour of the corolla in this species is yellow, and the fact that *Ridley* has mixed it (under his n. 1481) with *U. bifida* might be taken as corroborating Oliver's opinion. *Ridley*, in his paper on the Malay Peninsula *Utricularias*, says, however, that the flowers are pink.

10. *UTRICULARIA RACEMOSA*, Wall. ; var. *filicaulis*, Clarke in Flor. Brit. Ind. IV. 333. A slender herb of damp places. *Leaves* linear or spatulate, absent at time of flowering ; roots fibrous, bladders not seen. *Scapes* erect, very slender, 2 to 4 in. high, rarely higher, rather rigid, occasionally with a few branches, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* few scattered sessile ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the longer, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* white, from .15 to .2 in. across ; spur straight, conical or sub-cylindric, longer than lower lip of corolla. *Capsule* globose, .1 in. long, hidden by the adpressed calyx-lobes. *Seeds* minute, obscurely scrobiculate. *U. filicaulis*, Wall. Cat. 1501 ; A. DC. Prod. VIII. 21 ; Oliv. in Journ. Linn. Soc. III. 186. *U. nivea*, Vahl Enum. I. 203 ; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 144 ; Wight Ic. t. 1582. *U. setacea*, Wall. Cat. 6398 partly. *U. campestris*, Miq. in Pl. Hohenack. n. 596. *U. racemosa*, Ridl. Journ. Bot. XXXIII. 10 (*hardly of Wall.*).

MALACCA : Ayer Keroh, *Ridley* 10706 ! PAHANG : Kwala Pahang, *Ridley* 1474A ! SINGAPORE : Changi, *Ridley*. PENANG : Waterfall, *Curtis*, fide *Ridley*.—DISTRIB. Indo-China, India.

This plant probably quite deserves to be considered a species distinct from *U. racemosa*, though except in its usually smaller size and its white instead of blue flowers, there is little to distinguish the two.

11. *UTRICULARIA OPHIRENSIS*, Ridl. Journ. Bot. XXXIII. 10. A herb. *Leaves* linear-spatulate or spatulate, absent at time of flowering ; roots fibrous ; bladders not seen. *Scapes* erect 8 to 16 in. high, slender, rigid, often branching, glabrous ; beset with a few ovate scales or empty bracts acute at both ends and produced below point of attachment. *Flowers* sessile, clustered at the ends of the stems and branches in globose or oblong heads .3 to .5 in. long, .25 in. across ; bracts and bracteoles ovate-lanceolate, attached above the base. *Calyx* 2-lobed, lobes sub-equal, the upper slightly the larger, obtuse, .1 in. long in flower, in fruit .12 in. long. *Corolla* .25 in. across, variable in colour, the lower lip rose-coloured (*Ridley*), both lips blueish with a yellow

hairy gland in the centre of the lower lip inside (*Scortechini*), or white (*Curtis*, *Kunstler*), or white with a yellow tinge (*Kunstler*); spur straight with an incurved tip (*Ridley*), or curved ascending (*Scortechini*), .2 in. long. *Capsule* globose or depressed-globose, hidden by the adpressed calyx-lobes, .1 in. long. *Seeds* oblong or obovate, brown, the broad end glochidiate.

PERAK: Larut, *King's Collector* 1931! 3820! Thaipeng, *Wray* 131! *Scortechini* 376! PENANG: Waterfall, *Curtis*! MALACCA: Padang Batu, *Ridley* 10091!

This species, which is here sustained on the authority of Mr. Ridley, who knows well the Malayan *Utricularias* in the field, does not differ very greatly from *U. racemosa*, Wall.; not so much indeed as does the variety *filicaulis* previously described. It matters little whether the three forms are considered specifically distinct or are treated as manifestations of one protean species. A drawing by Mr. Ridley shows pink flowers.

12. *UTRICULARIA ORBICULATA*, Wall. Cat. 1500. A slender herb growing on wet banks, rocks, or tree-trunks. *Leaves* all radical or on small offsets, persistent, orbicular or orbicular-spathulate, .15 in. across; petioles distinct .15 to .25 in. long; roots fibrous, sometimes with bladders. *Scapes* erect, sub-capillary, 2 to 5 in. long; usually 2-4-flowered, sometimes 6-10-flowered; naked or with one or two empty scales, slightly produced at the base; flowers on capillary pedicels .15 to .25 in. long, rather distant; bracts and bracteoles minute, ovate-acute. *Calyx* 2-lobed, the lower lobe very much smaller than the upper, both obtuse, the upper often emarginate, .12 in. long in fruit and about as broad as long. *Corolla* pale violet or white with a yellow centre, .2 to .25 in. wide, with an explanate 5-lobed lower lip and a linear sub-acute spur .2 in. long about as long as the lower lip. *Capsule* globose, .1 in. across, covered by the upper calyx-lobe but projecting beyond the lower. *Seeds* minute, obovoid, glochidiate throughout the upper thicker half. A. DC. Prod. VIII. 18; Oliv. Journ. Linn. Soc. III. 187; Dalz. & Gibs. Bomb. Flor. 136; Hook. f. Flor. Brit. Ind. IV. 334; Ridl. Journ. Bot. XXXIII. 11. *U. pusilla*, Grah. Cat. Bomb. Pl. 165. *U. glochidiata*, Wight Ic. t. 1581.

KEDAH: Telayah Tujon, *Curtis*! PERAK: Larut, *Scortechini* 376! on Gunong Bubu, growing on steep side of hill in the sun, amongst moss, at 5,000 feet, flower pale violet; *Wray* 3880! on Gunong Mas, at 5,000 feet, flower white with yellow centre; *Wray* 4146! MALACCA: Mount Ophir, *Griffith*; *Ridley*!—DISTRIBUTION Throughout S.E. Asia.

Order LXXXVII. BIGNONIACEÆ.

Trees or climbing shrubs, more rarely herbs. *Leaves* opposite, rarely whorled or alternate, entire or 1- 2- 3-pinnate or digitate; leaflets entire or sometimes toothed. *Inflorescence* of terminal racemes or panicles; bracts various; flowers showy, usually large, hermaphrodite, irregular or regular. *Calyx* gamosepalous, campanulate, truncate or spathaceous or 2-5-lobed, valvate. *Corolla* gamopetalous, tubular-ventricose, mouth 2-lipped; lobes 5, sub-equal, patent or erecto-patent, bilabiate imbricate in bud. *Stamens* alternate with the corolla-lobes, inserted on the tube, 5 or more usually 4 from the fifth being absent or rudimentary; filaments filiform, often slightly thickened and sometimes hairy at the base; anthers 2-celled, included or shortly exsert; cells oblong or linear, parallel or divergent, dehiscing longitudinally. *Disk* hypogynous, cushion-like or annular, sometimes absent. *Ovary* sessile or shortly stalked, superior, 1-2-celled; style long, filiform; stigma of 2 flattened ovate or oblong lobes; ovules numerous, usually horizontal, anatropous, inserted in 2 to many rows in vertical lines along the edges of the septum in each cell. *Fruit* generally an elongate capsule, loculicidally or septicidally bivalved; the septum enlarged in fruit, deciduous together with the placentas. *Seeds* transverse, affixed by their margins to the septum or to enlarged placentas, vertically compressed, discoid or trigonous, often with a broad wing, embryo usually enveloped in a fine interior membrane; exalbuminous, cotyledons flattened, sometimes folded, radicle stout, lateral.—DISTRIB. Tropical regions of the world, a few in warm temperate regions; absent from Europe, the Mediterranean region and New Zealand. Species about 50.

Stamens 5; a tree with opposite 2-3-pinnate leaves and very

large flat capsules 1. OROXYLUM.

Stamens 4; trees:—

Anther-cells 2, both perfect:—

Leaves 1-3-pinnate:—

Calyx spathaceous, split on one side 2. DOLICHANDRONE.

Calyx lobed or truncate:—

Septum of the capsule cylindric, spongy:—

Septum prominently pitted; seeds trigonous, transversely grooved without, inner lobe fitting into the septum-pit; ovules 2-seriate in each cell. . . . 3. STEREOSPERMUM.

Septum only faintly pitted; seeds flat; ovules many-seriate in each cell 4. RADERMACHERA.

Septum flat, capsule winged; a large tree with large flowers 5. PAJANELIA.

Leaves simple, often verticillate; calyx usually more or less bilabiate	6. DIPLANTHERA.
Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2-3-pinnate leaves and very long narrowly-linear corolla-tube.. .. .	7. MILLINGTONIA.

1. OROXYLUM, Vent.

A glabrous tree. *Leaves* opposite, large, 2-3-pinnate; leaflets entire. *Flowers* large, in a long, stout, terminal raceme. *Calyx* large, leathery, campanulate, truncate or obscurely toothed, persistent. *Corolla* large, fleshy; tube campanulate-ventricose; lobes 5, 2 in upper, 3 in lower lip, recurved, toothed, crumpled. *Stamens* 5 inserted near base of tube, posterior one the shortest. *Anthems* 2-celled; cells parallel, oblong. *Disk* large, cushion-like. *Ovary* sub-sessile, contracted at the base, compressed; style slender; stigma 2-lobed; ovules in 4 vertical rows on each placenta, very many. *Capsule* very large, broadly linear, compressed parallel to the septum, septifragally 2-valved. *Seeds* very many, flattened, surrounded by a broad hyaline wing.—DISTRIB. A single S.E. Asiatic species.

OROXYLUM INDICUM, Vent. Dec. Gen. Nov. 8 (1808). A small tree, reaching 30 to 40 feet in height, with a clean bole and few branches or often none, the head bearing leaves only; branches thick; bark somewhat fleshy; pith large. *Leaves* extremely large, 1-3-pinnate, the lower 3-, middle ones 2-, upper 1-pinnate; 3 to 5 feet long, triangular in outline; rachis smooth, striate, stout, swollen at the base (pulvinus) and joints; primary pinnae about 45 pairs, the lower ones 2-pinnate at base, pinnules 3- to 5-foliolate; leaflets ovate, entire, acuminate at apex, side ones rounded and often unequal at base, terminal one cuneate at base; 3 to 6 in. long, 2 to 2.5 in. broad; main-nerves 4 to 5 pairs; petiolules slender, .2 to .3 in. long. *Raceme* branch-like, 2 to 3 feet long, very thick, lower part prominently marked with the ovate scars of fallen pedicels; pedicels .5 in. long, stout; bracteoles fused with pedicels. *Calyx* campanulate, 1 in. long, fleshy, truncate, with 5 short teeth. *Corolla* fleshy, 2.5 in. long, yellowish; lobes much crumpled, red, villous on both sides. *Stamens* 5, shortly exsert; base of filaments woolly; anthers divergent below; connective shortly mucronate. *Disk* fleshy, cupular, somewhat lobed. *Ovary* oblong; style slender, hollow, as long as the stamens; stigma 2-lobed, lobes rounded. *Capsule* shortly stalked, concave-flat, elongate oblong, 1.5 to 2.5 feet long, 2.5 to 3.5 in. broad, scarcely .3 in. thick, margins somewhat incurved, back keeled, valves woody, septum flat. *Seeds* very many, flat, surrounded by a very thin, hyaline, shining wing, somewhat rectangular in shape, 3 in. long, 1.5 in. broad; testa membranous; cotyledons emarginate, oblong. Kurz For.

Fl. II. 237; Clarke in Hook. f. Fl. Br. Ind. IV. 378; Trimen Fl. Ceyl. III. 281; Koord. & Val. Bijdr. I. 66; Cooke Bomb. Fl. II. 327; Prain Beng. Plants II. 787. *Bignonia indica*, Linn. Sp. Pl. (1753) 625; Lamk Dict. I. 423; Roxb. Fl. Ind. III. 110; Wall. Cat. 6514. *B. pentandra*, Lour. Fl. Cochinch. 379. *Spathodea indica*, Pers. Syn. II. 173. *Calosanthus indica*, Blume Bijdr. 760; DC. Prod. IX. 177; Wight Ic. t. 1337; Dalz. & Gibs. Bomb. Fl. 161; Bureau Monog. Bign. (1864) t. 9; Miq. Fl. Ind. Bat. II. 752; Brandis For. Fl. 347. "Palega pajaneli," Rheede Hort. Mal. I. t. 43.

PENANG: *Curtis* 983. PERAK: *Scortechini* 1613; *King's Collector* 7033. PAHANG: common on the banks of the river from Pekan up, flowers dull brownish-purple (*Ridley* in Trans. Linn. Soc. 2nd Ser. III. 326). MALACCA: *Maingay* (K.D.) 1213.—DISTRIB. India, Ceylon, Burma, Sumatra (*Forbes* 1284), Java, and east to Cochin China.

2. DOLICHANDRONE, Fenzl.

Trees. *Leaves* opposite, pinnate, leaflets entire or toothed. *Flowers* in terminal racemes or panicles, few, large. *Calyx* spathaceous, cleft to the base down the front, caducous. *Corolla-tube* long or short, inflated above; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; *anthers* glabrous, the cells oblong, at first parallel, afterwards divergent. *Disk* annular, cushion-like. *Ovary* sessile; ovules numerous, usually many-seriate. *Capsule* elongate, terete or somewhat compressed, straight or incurved, loculicidally 2-valved, the septum often thickened and making 4 spurious cells. *Seeds* 1 to ∞ -seriate on the margins of the septum, much compressed, the wing thickened or hyaline.—DISTRIB. Tropical Africa, Asia, and Australia, about 15 species.

DOLICHANDRONE RHEEDII, Seem. Journ. Bot. VIII. 380 (1870). A deciduous tree reaching 40 to 50 feet in height of stem; branchlets stout, marked with prominent leaf-scars, innovations glabrous. *Leaves* imparipinnate, 9 to 12 in. long, leaflets 2 to 4 pairs, with an end one, rachis slender; side leaflets rhomboid, unequal at base, acuminate at apex, margin entire or with few distant serratures, glabrous on both surfaces, 3 to 4 in. long, 1.5 to 2.5 in. broad, main-nerves 6 to 7 pairs, petiolule slender, articulate at base, .3 to .5 in. long; end leaflet similar, but equal at base; all nearly black when dry. *Flowers* few, usually 1 to 4 in a short terminal corymbose raceme; pedicels glabrous, 1 to 1.5 in. long. *Calyx-tube* closed in bud and beaked, spathaceous in flower, 1.5 in. long. *Corolla* white, tubular-funnel-shaped, 4 to 7 in. long; tube slender at first, then gradually expanding; lobes 1 in.

long, crenately crisped, recurved. *Stamens* 4, didynamous; filaments curved inwards; anther-cells large, oblong, divaricate. *Ovary* conical, style slender, stigma of 2 rounded lobes. *Capsule* 1 to 2 feet long, about 1 in. broad, flattened-cylindrical, faintly ribbed, septum thickened in the middle on both sides. *Seeds* very many, overlapping in many rows, rectangular (with the wings), .5 to .7 in. long, .3 in. broad, wings corky; testa membranous; cotyledons flat, deeply emarginate, the lobes nearly orbicular; radicle short. Clarke in Hook. f. Fl. Br. Ind. III. 379; Trimen Fl. Ceyl. III. 282; Koord. & Val. Bijdr. I. 69. *D. longissima*, K. Sch. in Engl. & Prantl Pflanzenfam. IV. 2B. 240, fig. 92 B-D. *Bignonia spathacea*, Linn. f. Suppl. 283. *B. longissima*, Lour. Fl. Cochinch. 380? *Spathodea longiflora*, Vent. Choix. n. 40. *S. Rheedii*, Wall. Cat 6516; DC. Prod. IX. 206; Wight Ic. t. 1339; Bedd. Fl. Sylv. CLXVIII.; Kurz For. Fl. II. 234; Miq. Fl. Ind. Bat. II. 754. *S. ? Loureiriana*, DC. l.c. 209? *S. Diepenhorstii*, Miq. l.c. "Nir Pongelion," Rheed Hort. Mal. VI. t. 29.

PENANG: Curtis 1184. PERAK: *Scortechini* 1098; Wray 2501. PAHANG: in mangrove swamps (*Ridley* l.c.). MALACCA: *Griffith* (K.D.) 4066; *Maingay* (K.D.) 1210.—DISTRIB. Malabar coast of India, Ceylon, Burma, Andaman Islands, Malay Archipelago east to New Guinea.

3. STEREOSPERMUM, Cham.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire or sometimes toothed. *Flowers* in large lax terminal panicles, white pink or yellow. *Calyx* ovoid, open or closed in bud, truncate or shortly unequally lobed in flower. *Corolla* campanulate or funnel-shaped; mouth bilabiate, upper lip 2-, lower 3-cleft; lobes nearly equal, rounded, crisped, toothed or lacinate. *Stamens* 4, didynamous, included fifth rudimentary; anthers glabrous, cells linear divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, 2-seriate in each cell. *Disk* cupular, fleshy. *Capsule* elongate, terete or somewhat angled, loculicidally 2-valved; septum thick, corky, cylindrical, pitted to receive the seeds in alternating cavities. *Seeds* trigonous, with a transverse groove without and a prominent ridge within, which fits into a deep pit in the septum; wings membranous, lying flat upon the septum; cotyledons folded, 2-lobed, radicle straight.—DISTRIB. Tropical Asia and Africa. About 12 species.

STEREOSPERMUM FIMBRIATUM, DC. Prod. IX. 211 (1844). A large deciduous tree, reaching 70 to 80 feet in height of stem and 1.5 to 3 feet in diam.; bark grey, rough; branchlets stout, innovations and inflorescence viscid-pubescent. *Leaves* imparipinnate, 1 to 2 feet long; rachis

grooved, viscid-pilose; leaflets 7-9, side ones opposite slightly unequal at base; end one equal, oblong-lanceolate, long-acuminate at apex, rounded at base, entire, membranous, viscid-pilose at any rate when young, afterwards glabrescent on upper surface; 4 to 6 in. long, 1.5 to 1.75 in. broad; midrib slender, main-nerves about 7 pairs, curving upwards to and along the margin, reticulations prominent, transverse; petiolules of side leaflets .3 to .4 in. long, of end one 1-1.5 in., articulate. *Panicle* large, very viscid-pilose, dichotomously branched, 5 to 9 in. long and broad; peduncle short, about .5 in. long, thick, secondary peduncles 1 to 1.5 in. long; pedicels slender, about .5 in. long; bracteoles very small, subulate, early caducous. *Flowers* pale lilac, the tube rather darker. *Calyx* campanulate, viscid-pubescent without, glabrous within, .5 in. long; lobes 5, rounded, very short, long-apiculate. *Corolla-tube* funnel-shaped, .1 to .15 in. long; lobes 5, as long as tube, spreading, long-fimbriate, the laciniae .025 in. long. *Stamens* 4, didynamous; filaments slender, glabrous; anther-cells linear-oblong, divaricate, recurved, .05 in. long. *Ovary* cylindric, glabrous; style slender, stigma 2-lobed. *Capsule* cylindric, more or less quadrangular, torulose, 1 to 2 feet long, .5 in. in diam.; septum thick, corky. *Seeds* trigonous, with rather thick wings; 1 in. long, .3 in. broad, deeply immersed in alternate pits in the septum. Kurz For. Fl. II. 231; Clarke in Hook. f. Fl. Br. Ind. IV. 383. *Bignonia fimbriata*, Wall. Cat. 6500.

JUNKSEYLON (Tongkah): Curtis 2912. PERAK: Wray 3334; Scortechini 1746; King's Collector 5701. PAHANG: Ridley l.c. MALACCA: Maingay (K.D.) 1211.—DISTRIB. Burma.

4. RADERMACHERA, Zoll & Mor.

Trees. *Leaves* opposite, 1-2-pinnate; leaflets petiolulate, entire. *Flowers* in terminal racemes or panicles, showy. *Calyx* urceolate, open or closed in bud, entire or shortly lobed in flower. *Corolla* funnel-shaped; tube narrow, mouth more or less 2-lipped, upper lip 2-, lower 3-lobed, the lobes spreading, rounded. *Stamens* 4, didynamous, with a fifth sterile one, included; filaments slender; anthers 2-celled, the cells divaricate. *Disk* cupular, fleshy, entire. *Ovary* cylindrical; cells 2; ovules very numerous in many rows in each cell. *Capsule* slender, compressed, terete, often spirally twisted; the septum slender, continuous, cylindric or compressed, very faintly pitted and bearing on each side a double row of seeds. *Seeds* very small, rounded, flattened, resting on a very slight depression but not sunk in the septum; wings hyaline, shining; cotyledons flat, not lobed; radicle minute.—DISTRIB. Burma, the Malay Peninsula, and Malay Archipelago. About 8 species.

Leaves 1-pinnate, leaflets prominently glandular at base, capsule under 10 in. long	..	..	..	..	..	1. <i>R. glandulosa</i> .
Leaves 2-3-pinnate, leaflets not glandular at base, capsule over 15 in. long	..	..	..	..	..	2. <i>R. amena</i> .

1. *RADERMACHERA GLANDULOSA*, K. Sch. in Engl. & Prantl Naturl. Pflanzenfam. IV. 3B, 243 (1894). A small tree with spreading branches, reaching 15 to 30 feet in height and 6 to 12 in. in diam. of stem; branches stout, with pale brown, corky bark; branchlets smooth, with prominent oblong lenticels; innovations slightly puberulous. *Leaves* imparipinnate, 15 to 20 in. long; rachis smooth, swollen at the nodes and at the base, glabrous; leaflets 3 to 7, side ones opposite, slightly unequal at base, end one equal, all furnished with prominent large glands at the base above the petiolule, elliptic or elliptic-oblong, acute or abruptly acuminate at apex, rounded at base, entire, glabrous, chartaceous, 5 to 10 in. long, 3 to 5 in. broad; midrib slender, main-nerves 9 to 11 pairs, arching upwards to and along the margin; reticulations transverse, prominent; petiolules .3 to .4 in. long, end one 1 in. long. *Panicles* terminal and occasionally axillary, 6 to 12 in. long; peduncle often very long, branches short, scarcely .5 in. long, few-flowered; pedicels slender, .2 to .4 in. long; bracteoles minute, caducous; flowers white, shaded with pink, calyx red. *Calyx* campanulate, truncate, persistent, .15 in. long, glabrous, margin undulate only. *Corolla-tube* cylindric below for .5 in., then campanulate for nearly 1 in., .5 in. wide at mouth, glabrous without, slightly pubescent within; lobes 5, 2 upper smaller than 3 lower, .3 in. long, margins slightly crispate-ciliate. *Stamens* 4, didynamous, included; filaments slender, anther-cells linear, .1 in. long, divaricate, sterile stamen clavate. *Disk* cupular, glabrous. *Ovary* oblong; style slender, .75 in. long; stigmas 2, oblong. *Capsule* slender, terete, 6 to 10 in. long, .25 in. broad; valves thin, chartaceous, flat after dehiscence, slightly keeled on back; septum cylindric, slightly pitted, white, spongy. *Seeds* very many, flat, .6 to .8 in. long and .05 to .1 in. broad (including the hyaline often fimbriate wings); testa membranous; cotyledons flat, oblong, broader than long (.05 in.); radicle minute. *R. stricta*, Zoll.; Bureau Monog. Bign. t. 28. *Spathodea glandulosa*, Blume Bijdr. 762; DC. Prod. IX. 207; Miq. Fl. Ind. Bat. II. 755. *Bignonia Portcriana*, Wall. Cat. 6509; DC. l.c. 165. *Lagaropyxis glandulosa*, Miq. in Ann. Mus. Lugd. Bat. I. 199. *Stereospermum glandulosum*, Miq. Fl. Ind. Bat. Suppl. 565; Clarke in Hook. f. Fl. Br. Ind. IV. 383; Koord. & Val. Bijdr. I. 74.

PENANG: *Wallich* 6509; *Curtis* 140. PERAK: *Wray* 1346, 2143; *Scortechini* 114, 1156; *King's Collector* 3353, 6379; *Kunstler* 981. MALACCA: *Maingay* (K.D.) 1217; *Goodenough* 1960. SELANGOR: *Ridley*

8537. NEGRI SEMBILAN: Goodenough 1860. PAHANG: Ridley l.c.—
DISTRIB. Burma (Lobb), Sumatra (Forbes 2663, 2693), Java, Borneo
(Beccari 811).

2. *RADERMACHERA AMÆNA*, Seem. Journ. Bot. VIII. 146 (1870). A very tall tree, reaching 80 feet in height, all parts glabrous; branches thick, with prominent leaf-scars. *Leaves* 2–3-pinnate, apparently 2 feet long or longer, the lower pinnæ only again divided, the upper ones simply pinnate; rachis smooth, thick, swollen and articulate at the nodes, enlarged at foot; petiole about 6 in. long, all joints easily separating when dry: leaflets oblong-lanceolate when young, elliptic-oblong when old, shortly and abruptly blunt-acuminate at apex, rounded or attenuate at base and slightly decurrent, glabrous, entire, coriaceous, 4 to 6 in. long, 2 to 3 in. broad; midrib thick, impressed above, main-nerves about 10 pairs, joined at about .25 in. from the margin in a looped nerve, secondary nerves alternate with the main-nerves, reticulations obscure; petiolules .4 or .5 in. long, channelled above by the decurrent margins of the blade. *Panicles* much and usually trichotomously branched, rachis terete, upper branches channelled; peduncle about 5 in. long; pedicels slender; bracteoles minute, rounded; flowers white, tinted with pink outside and with yellow streaks within; the calyx dark red. *Calyx* in bud closed, in flower 2-lipped, the lips bluntly apiculate; tube and lobes equal, .3 in. long, glabrous, deciduous. *Corolla-tube* shortly cylindric at first for .2 to .3 in. long, then campanulate, glabrous; lobes nearly equal, rounded, crenulate on the margins, .2 to .3 in. long. *Stamens* 4, with an abortive fifth; filaments thickened and glandular-hairy below, slender and glabrous above; anther-cells linear, curved, divaricate, the connective prominently apiculate. *Disk* cupular, glabrous. *Ovary* oblong, flattened; style slender, as long as tube; stigma bilobed, lobes lanceolate; cells 2, ovules very many. *Capsule* slender, torulose, 12 to 18 in. long, 3 in. broad; valves thin, chartaceous, flattened after dehiscence and then .25 in. broad, keeled on the back; septum cylindric, spongy, speedily caducous, bearing on each border a row of small seeds. *Seeds* (with wings) .75 in. long, .1 to .15 in. broad, wings hyaline, rounded; testa membranous; cotyledons flat, oblong, longer than broad; radicle minute. Kurz For. Fl. II. 232. *R. gigantea* and *R. Lobbii*, Miq. in Ann. Mus. Lugd. Bat. III. 250. *Spathodea amæna*, DC. Prod. IX. 208. *S. Lobbii*, Teyss. & Binn. in Nat. Tijdsch. XXV. 413. *Spathodea gigantea*, Bl. Bijdr. 761; Miq. Fl. Ind. Bat. I. 755; DC. l.c. 207. *Bignonia amæna*, Wall. Cat. 6512 and Pl. As. Rar. II. 78. t. 183. *Lagaropyxis gigantea*, Miq. in Ann. Mus. Lugd. I. 198. *Stereospermum hypostictum*, Clarke in Hook. f. Fl. Br. Ind. IV. 384; Koord. & Val. Bijdr. I. 72.

PERAK: *Scortechini* 1496; *Wray*. MALACCA: *Griffith* (K.D.) 4070; *Maingay* 1212 (*part*). SINGAPORE: *Maingay* (K.D.) 1212 (*part*); *Cantley* 79,204.—DISTRIB. Tavoy, Java.

5. PAJANELIA, DC.

A large tree, glabrous except the flowers. *Leaves* large, imparipinnate; leaflets entire, numerous. *Flowers* large, in large terminal thyrsoid panicles, dark red. *Calyx* large, ovoid and closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla-tube* cylindric below, ventricose-campanulate above, wide at the mouth; limb sub-bilabrate, lobes 5, spreading, recurved, unequal. *Stamens* 4, with a rudimentary fifth, didynamous, sub-exsert; filaments slender; anthers glabrous, cells oblong, divergent. *Disk* annular. *Ovary* 2-celled, ovules on each placenta numerous, ∞ -seriate. *Fruit* an elongate narrowly oblong capsule, loculicidally dehiscent, the septum contrary to the valves, the margins of the valves extended in broad wings. *Seeds* in several rows on the edges of the septum, compressed, with hyaline wings; cotyledons flat, radicle small.—DISTRIB. A single S.E. Asiatic species.

PAJANELIA MULTIJUGA, DC. Prod. IX. 227 (1845). A large evergreen tree, reaching 60 to 80 feet in height and 2 feet in diam. of stem; glabrous except the corolla; bark .25 in. thick, dark grey, rough; branches thick, lenticellate. *Leaves* imparipinnate, 1.5 to 3 feet long, glabrous; rachis angular; leaflets 10 to 12 pairs with a terminal one, very unequal-sided, elliptic-ovate, acute at apex, rounded at base on the upper, cuneate on the lower side, chartaceous, margins entire recurved, 4 to 8 in. long, 2.5 to 3.5 in. broad; midrib slender, main-nerves 9 on upper, 7 on lower side, reticulations transverse; petiolule stout, .2 to .3 in. long. *Panicles* thyrsoid, 12 to 18 in. long; rachis stout, fleshy, lenticellate; primary branches 1 to 2 in. long, similar, secondary ditrichotomously branched; pedicels .5 in. long; bracteoles minute; flowers large, pale yellow, throat purple within. *Calyx* closed in bud, in flower campanulate, 1 to 1.5 in. long; tube broad at base with keel-like folds without, lobes 5, irregular, acute. *Corolla* 2 to 2.5 in. long, cylindric below, then somewhat constricted, then ventricose-campanulate; lobes 5, unequal, at first parallel-sided, then broadening into a blunt rounded crispately crenulate limb; the upper part of the tube and the lobes, especially on the margin, grey-pubescent. *Stamens* 4 with a rudimentary fifth, didynamous; filaments slender, glabrous; anther-cells oblong, divergent. *Disk* annular, pulvinate, glabrous. *Ovary* sessile, oblong; style slender, angled, broadening upwards into a 2-lobed clavate stigma; cells 2, ovules very numerous. *Capsule* flat, lanceolate, broadly winged, the wings split, glabrous, 1 to 1.5 feet long, 2 to 2.5 in. broad; septum

transverse, quadrangular in section. *Seeds* exceedingly numerous, in many rows and imbricating, curved; furnished at either end with a very thin hyaline wing, seeds and wing reaching 1·5 in. long and ·5 in. broad; testa membranous; cotyledons obcordate, flat; radicle slender. Bureau Monog. Bign. t. 20; Kurz For. Fl. II. 237. *P. Rheedii*, Wight Ic. tt. 1343-4; Clarke in Hook. f. Fl. Br. Ind. III. 384; Bedd. Fl. Sylv. CLXIX.; Cooke Bomb. Fl. II. 333; Prain Beng. Plants II. 790. *Bignonia indica*, var. β Linn. Sp. Pl. 871; Lour. Fl. Cochin. 460. *B. Pajanelia*, Ham. in Trans. Linn. Soc. XIII. 316. *B. longifolia*, Willd. Sp. Pl. III. 306; K. Sch. in Engl. & Prantl Pflanzenfam. IV. 3b, 244. *B. multijuga*, Wall. Cat. 6503 and Pl. As. Rar. 1. 81, tt. 95, 96. "Pajaneli," Rheede Hort. Mal. I. 44.

PENANG: *Jack*. PERAK: *Scortechini*; *King's Collector* 2616, 3958.
—DISTRIB. Eastern Bengal, Burma, Andaman Islands, Malabar coast.

6. DIPLANTHERA, Banks & Solander.

Trees, more or less hairy. *Leaves* undivided, large, opposite or whorled. *Flowers* large, yellow, in short thick panicles among the uppermost leaves, the primary branches of the panicles shortly verticillate and densely cyme-bearing. *Calyx* campanulate, oblong and closed when young, with 2 to 5 valvate lobes connivent in flower and sometimes sub-bilabiate. *Corolla* tubular-ventricose; lobes 5, rounded, sub-equal. *Stamens* 4, didynamous, exsert; filaments involute in bud; anthers glabrous; cells linear, at first parallel, afterwards divaricate. *Disk* thick, pulvinate. *Ovary* sub-sessile, ovules densely many-seriate. *Capsule* oblong-fusiform, woody, loculicidally 2-valved; septum flat, thick. *Seeds* many-seriate, between the margins of the septum, flattened, with a broad hyaline wing.—DISTRIB. From the Malay Peninsula to New Caledonia and Australia: about 6 species.

DIPLANTHERA BANCANA, Scheffer in Nat. Tijdschr. XXXI. 334 (1870). A lofty tree; branches stout; branchlets pale brown, pubescent, marked with lenticels and prominent leaf-scars. *Leaves* chartaceous, undivided, ovate, obtuse at apex, cordate at base; margins irregularly undulate, furnished with 1 to 2 glandular pits on the upper surface at the insertion of the petiole; both surfaces slightly pubescent, especially beneath and on the nerves; 8 to 13 in. long, 5 to 8 in. broad; midrib stout, main-nerves 10 to 12 pairs, the lowest 3 close together and spreading more or less downwards or horizontally, the rest distant, irregular, often branched at two-thirds of their length, the branches all anastomosing near the margin; reticulations prominent, transverse; petiole stout, 2 to 4 in. long, base articulate. *Panicles* terminal, 4 to 5 in. in diam., tawny-villous; common peduncle 5 to 6 in. long, ·25 in. thick;

branches easily disarticulating; pedicels slender, .75 in. long; bracts leafy, spatulate, .2 in. long; bracteoles linear-subulate, .1 to .2 in. long; flowers yellow. *Calyx* campanulate, closed in bud, 5-lobed in flower, .7 to .8 in. long; often 2-labiate, the upper lip with 2 divisions of 2 lobes each, the lower 1-lobed, acute; tube puberulous without. *Corolla* tubular-ventricose, 1 in. long; lobes 5, uppermost and 2 lowest acute; side lobes broadly obtuse, margins incurved; tube glabrous except for a ring of tawny hairs at the insertion of the filaments. *Stamens* 4, filaments inserted a little above the base of the tube, involute in bud; anther-cells linear, pendulous. *Ovary* oblong; style slender; stigmas 2, lanceolate; ovules very many. *Capsule* 6 in. long, 1.2 in. broad, smooth, valves boat-shaped after dehiscence. *Seeds* 1.5 in. long, .75 in. broad, winged on 3 sides; cotyledons flat, emarginate, .15 in. long, .25 in. broad. Clarke in Hook. f. Fl. Br. Ind. IV. 385.

PENANG: *Curtis* 870, 1569. MALACCA: *Walker* 283; *Maingay* (K.D.) 1214.—DISTRIB. *Bangka* (*Teysmann* 7666).

7. MILLINGTONIA, Linn. f.

A tall tree with corky bark. *Leaves* opposite, 2–3-pinnate; leaflets entire or crenate. *Flowers* white, in terminal corymbose panicles. *Calyx* small, cupular, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, sub-equal, sub-valvate, the 2 upper connate to near the middle. *Stamens* 4, didynamous, with no rudimentary fifth, shortly exsert, inserted on the mouth of the tube; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular, cushion-like. *Ovary* sub-sessile, cylindric-conical; style slender; stigma bi-lobed; ovules numerous, in about 4 rows on each placenta. *Capsule* linear, compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, surrounded on 3 sides by a thin hyaline wing.—DISTRIB. A single S.E. Asiatic species.

MILLINGTONIA HORTENSIS, Linn. f. Suppl. 291 (1781). A tall erect tree reaching a height of 80 feet and a girth of 6 to 12 feet; bark corky, deeply fissured; branches stout, drooping; branchlets somewhat slender, flattened, lenticellate; innovations and young leaves slightly pubescent. *Leaves* opposite, 2–3 pinnate, about 1.5 to 2 feet long or longer; rachis angular, channelled; leaflets ovate or ovate-lanceolate, acuminate at apex, truncate at base, membranous; glabrous when old, pubescent when young; margins entire or (in young plants and shoots chiefly) broadly crenate; 1 to 2 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces as are the 4–5 pairs of main-nerves; petiolules slender, in upper leaflets often none. *Panicles* 8 to 12 in. long, branches divaricate; rachis somewhat angular, flattened; peduncles

1 to 3 in. long; bracts and bracteoles very small, caducous; pedicels slender, .3 to .4 in. long; flowers white. *Calyx* cupular, .1 in. long; lobes very shallow, rounded, recurved. *Corolla-tube* very slender, 1.5 to 2.5 in. long, about .07 to .1 in. broad, glabrous; lobes ovate-oblong, acute, pubescent within, .5 to .6 in. long, .2 to .3 in. broad. *Stamens* inserted at the top of the tube; filaments slender, .4 to .5 in. long; anthers rounded, ovate. *Ovary* slender; style very slender, exsert, stigma-lobes ovate. *Disk* cushion-like, .05 in. high. *Capsule* about 12 to 15 in. long and .75 in. broad, acute at both ends; valves woody, septum ultimately free. *Seeds* in several rows along the margins of the septum, much overlapping, including the wing about 1 in. by .5 in.; wing narrow at the apex, hyaline. DC. Prod. IX. 182; Wight Ill. 16 *bis* fig. 6; Bureau Monog. Bign. t. 8; Bedd. Fl. Sylv. Madr. t. 249; Brandis For. Fl. 347; Kurz For. Fl. II. 238; Clarke in Hook. f. Fl. Br. Ind. IV. 377; Cooke Bomb. Fl. II. 334; Prain Beng. Plants 788. *Bignonia Azedarachta*, Koen. Ann. Bot. I. 178. *B. suberosa*, Roxb. Cor. Pl. III. 11, t. 214 and Fl. Ind. III. 111; Wall. Cat. 6513.

MALACCA: *Maingay* (K.D.) 1215. SINGAPORE: *Deschamps*.—
DISTRIB. India, Burma (*vide* Kurz), Sumatra (*Miq. Fl. Ind. Bat. Suppl.* 565).

Whether the specimens were gathered from really wild trees there is nothing to show, but if Kurz is right in his statement that the cork-tree, so well known in India in cultivation, is wild in tropical forests from Martaban to Tenasserim, it may well occur in a wild state further south in the Peninsula.

Order LXXXVIII. PEDALINEÆ.

[By D. PRAIN.]

Herbs or undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed; stipules 0. *Flowers* irregular, solitary or, rarely, clustered or racemose, usually axillary; pedicels short; bracts minute or 0. *Sepals* 4–5, slightly connate below. *Petals* connate in a tubular-ventricose corolla; limb 5-lobed, obscurely 2-lipped; lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Carpels* 2, connate in a 2-celled, rarely 1-celled ovary; ovules many or few, superposed; style filiform; stigma shortly 2-lobed. *Fruit* hard, indehiscent, or a 2- (less often 3–4-) valved capsule. *Seeds* without wings; albumen 0.—DISTRIB. Species about 40, in tropical and sub-tropical countries.

SESAMUM, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed, lobed, or divided. *Flowers* axillary, solitary or few and

fascicled, shortly pedicelled. *Sepals* connate in a small 5-partite calyx. *Corolla* 2-lipped; tube ventricose; lobes rounded, those of the upper lip rather smaller than the others. *Stamens* 4, didynamous, included; anthers sagittate, cells sub-parallel, distinct. *Carpels* connate in a 2-celled ovary; cells soon divided into two chambers by a false dissepiment intruded between the placentas; ovules many, 1-seriate in each chamber; style filiform; stigma 2-lobed. *Fruit* an oblong or ovoid capsule, usually 4-angled and 4-grooved, 4-chambered, loculicidally 2-valved. *Seeds* many, obliquely oblong, somewhat compressed, foveolate.—DISTRIB. Species 10, Africa and S.E. Asia.

SESAMUM INDICUM, DC. Prod. IX. 250. An erect pubescent or puberulous herb, 1 to 2 feet high. *Leaves* oblong or ovate, variable, the lower often lobed or pedatisect; the middle ovate, toothed; the upper often narrow-oblong, sub-entire; blade 3 to 5 in. long; petioles .5 to 2 in. *Flowers* axillary, solitary rarely 2-3-nate; pedicels .5 in. long. *Calyx-lobes* .25 in. long, lanceolate. *Corolla* pubescent, 1.25 in. long, whitish or with red, or purplish, or yellow marks. *Capsule* oblong, tetragonous, erect, scabrid-pilose, 1 in. long, uniformly .25 in. wide throughout; apex usually shortly acuminate; dehiscence usually by 2 valves half-way down, sometimes to the base, and sometimes each valve subsequently divided. *Seeds* brown, smooth. Wall. Cat. 6408; Wight Ill. 163; Hook. f. Flor. Brit. Ind. IV. 387; Bot. Mag. t. 1688. *S. orientale*, Linn. Sp. Pl. 634; Gaertn. Fruct. II. 132 t. 110; Lamk Ill. t. 528; Roxb. Flor. Ind. III. 100. *S. luteum*, Retz Obs. VI. 31; DC. Prod. IX. 250. *S. occidentale*, Her. & Reg., DC. Prod. IX. 250; Thw. Enum. 442. Rumph. Herb. Amb. t. 76, f. 1. Rheed. Hort. Malab. IX. tt. 54, 55.

PENANG: *Wallieh!* King! PERAK: *Wray!* Seorteehini! MALACCA: *Derry!* JOHORE: *Fielding!* SINGAPORE: *Hullett!*—DISTRIB. Cultivated in all hot countries.

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